Food Manufacture

The Journal of the Food Industry

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British Canning Convention.

THE ANNUAL Canners' Convention and Canners' and Allied Trades Exhibition held under the auspices of the National Food Canning Council on the 25th, 26th, and 27th of this month in the Corn Exchange, Cambridge, is another "milestone" in the steady advancement of British canning. The first Exhibition was held during last year's Convention at Worcester, and was an unqualified success. The accommodation was, however, insufficient for more than a fraction of those who desired to exhibit. All the leading canners will be represented at Cambridge, and a section will be devoted to machinery and accessories. There is every indication that this year's Convention will far outstrip its predecessor. The chairman of the Council is Sir Edgar Jones, and the Hon. Secretary is Mr. H. W. Packer. All communications relating to the Convention should be addressed to F. Wilkins (Exhibition Agencies), Limited, 149, Fleet Street, London, E.C. 4.

The National Council.

On another page will be found the report of the National Food Canning Council for the year 1928-1929. A glance through this report is sufficient to convince anyone of the immense amount of excellent work that has already been accomplished by the Council in the interests of British canning. Its primary object is to promote the organisation of food canning, in co-operation with producers and distributors, so as to increase the quantity and consumption of home-grown produce.

Towards this end, strenuous efforts have been made to awaken the interest of consumers, distributors, and retailers in British canned goods. In this, great assistance has been given by the Press and by the Exhibitions provided by the Empire Marketing Board through the Ministry of Agriculture and Fisheries. The Council is arranging for a number of these exhibitions to be held during 1929 and 1930, both independently and through the Empire Marketing Board. It is interesting to note that special efforts have been made to get Government and local government departments to purchase British canned goods for their requirements, with practical results to producers. The same applies to the Navy, Army, and Air Force contracts departments and to the large stores in London.

The relation of fruit culture to the canning industry is a matter of vital importance in this country. It is therefore satisfactory to find that the National Council reports that interest in the canning movement is being shown by the growers and that fruit culture is extending. Further remarks on this subject will be found on later pages.

Prejudice Overcome.

Propaganda is being intensified and broadened by means of the cinema and lantern lectures. The publication of two pamphlets by the New Health Society has done much to overcome prejudice and to correct misleading statements concerning canned foods. Readers will recollect that we discussed these pamphlets at considerable length in the February issue. We quoted the President of the New Health Society as having arrived at the definite conclusion that "*The conditions introduced by modern science are such that foodstuffs canned under them are at least as pure as, and in many cases purer than, natural foods treated with less care under ordinary trade conditions.*" That, as we remarked, puts the whole truth of the matter in a nutshell, and it should dissipate, once and for all, the last shreds of suspicion and uncertainty lurking at the back of the public mind.

Pea Canning.

Six firms canned peas last season; three having done so for the first time. This season the new factory at Wisbech will be operating on a very much greater production to meet increased demands. There is confidence in a future large demand for

canned peas, and a number of firms are seriously considering the establishment of factories. Finally, the success which attended the use of the new process in last season's peas pack has contributed to the general feeling of optimism.

British Peculiarities.

No branch of commercial enterprise is entirely isolated, and an improvement in one industry is invariably reflected in an increase in the prosperity of several others. This is particularly true in regard to the canning industry, where the rapid development along scientific lines is not only encouraging the agriculturist to increase his acreage under fruit and vegetables, but is also giving employment to an increasing large number of men engaged in the canning industry itself, and in the manufacture of tinplate, tin cans, and lacquers.

One has only to study the history of American canning to appreciate the full significance of the above statement. It is true—as Mr. Seabrook points out on another page—that in England the conditions are almost exactly the reverse of those in U.S.A. and Canada. In this country the canners are in direct competition with the fresh fruit markets, whereas in America the crops are raised for the express purpose of canning. Under existing conditions, canners will have to grow their own fruit, or else they will have to enter into such definite contracts with the growers as will insure an adequate supply of fruit at satisfactory and stabilised prices, and also standardised as to variety, quality, and condition.

The N.C.A.

The research laboratory of the National Canners' Association was founded in 1913 at the instigation of the American Can Company and the Continental Can Company. This was prompted by recognition of the need for an independent body to take up and to work impartially upon the major and more fundamental problems of the industry. The first chemists were Bigelow, Fitzgerald, and the Bittings. In 1914 reports on the results achieved appeared in the form of bulletins, and these dealt with matters concerning tomato pulp and swells and springers. Since then some twenty-five bulletins have been published dealing with a variety of problems of vital importance to the canning industry. When it is realised that no publications were issued during the war period, these twenty-five bulletins, and also fifteen circulars, testify to the admirable enterprise of the Association.

Spoilage of Peas.

One of the most useful pieces of work carried out by the Association has been that relating to the rates of penetration of heat in various foods. This was rendered possible by the application of the thermo-couple. Bulletin 16-L, issued in 1920, gives the results of this work. Soon after, a parallel study was begun. Bacteria were isolated from all kinds of spoiled canned foods, and were studied in various ways. Detailed attention was given to the question of the heat resistance of their spores. Through a mathematical consideration of the combined heat penetration and heat resistance data, "theoretical" processes for standard products were determined. The "theoretical" processes were checked by experimental packs. The sum total of all information available was then used as a basis for recommended processes. Later, it was found that these recommended processes failed to protect against spoilage in certain instances. This led to further bacteriological investigations, which revealed the activities of thermophilic, or "heat loving" bacteria, particularly in the spoilage of corn or peas. The great majority of bacteria grow best at temperatures between 85° F. and 100° F. In the case of thermophilic organisms, however, the most suitable temperature—from their standpoint—is in the vicinity of 130° F. The bulletin which describes the work done on the thermophilic contamination in the canning of peas and corn appeared in July of last year, and it marks an important step forward in our knowledge of the science of canning.

Progress!

The work undertaken by the National Canners' Association during 1928 is particularly interesting. We do not wish to be continually parading the exploits of this body before English canners; on the other hand, it would be foolish to ignore the vast amount of useful work that has been accomplished. It should act as a stimulus, and it should suggest to English canners the possibilities of organising an equally useful body of workers in this country. Judging by the papers to be read in June at the English Canners' Convention at Cambridge, and bearing in mind the great disparity in size between the American and English representatives of the industry, we are impressed by the high quality of the home talent. It only requires to be organised in order to become effective. In this respect alone, the Cambridge Convention is performing an invaluable function.

Everyone interested in the development of our canning industry should carefully study the papers read at the last American convention. They have been published and republished for the whole world to read. There is no attempt at secrecy. Although we do not in this country pay anything towards the upkeep of the Association and its laboratories, yet we receive the full benefits of its work. That seems to us more in keeping with big business and the spirit of science and modern industry than the petty,

medieval, and unpatriotic method of limiting inside information to those that contribute to the funds of what is nothing more or less than a secret society. It is true that we have a Food Investigation Board, and that it performs a useful function; but it is a specialised function, and owing to the fact that it has set itself the task of building up a body of scientific knowledge relating to the food industries from the very foundations, it lags a long way behind the day-to-day requirements and difficulties of the practical canner. It is still buried below the surface, digging deep down into the foundations. Some time in the future there will be a magnificent edifice, but in the meantime, we—the small man, the beginner, and the intending beginner who cannot afford to pay big fees for advice—are left out in the cold. We want an organisation equipped with laboratories and plant to which we can take our practical difficulties and receive help without any delay. We want to be able to discuss these difficulties with practical men who are at the same time scientists. A convention meets only once a year; that is excellent, but it is not enough. That is why we have stressed the American model.

Campden.

To some extent these requirements are met by the Campden Research Station. We say "to some extent," because this is nothing more than the nucleus of what should be, in the present nursery stage of the industry, a big, vigorous institution unstinted as to funds, staff, and equipment. Essentially, it is exactly the kind of institution required and, considering its lack of equipment and staff, Campden has performed wonders—thanks to the present Director, Mr. Hirst, and his predecessor, Dr. Appleyard. During the Second Canning Convention held at Worcester last year, many canners had an opportunity of seeing for themselves the nature of the work that was being carried out. Its policy has always been to give the utmost *practical* (not academic) advice on fruit and vegetable preserving.

Originally the outcome of the scheme of food production instituted by the Ministry of Agriculture during the war, this station has since extended its activities to cover research, educational, and advisory work connected with all aspects of the preservation of fruit and vegetables. Some examples of its service to the industry may be given.

Perhaps the most welcome sign of progress in the industry has been the rapid development of pea canning, and this has been largely due to the introduction of the method of keeping the peas green which was worked out at Campden.

Extensive tests on the most suitable varieties of the various fruits and vegetables for canning have also furnished information which is of advantage to grower and canner alike.

Another important function of this research station has been to act as the advisory centre for the young and thriving canning industry. Inquiries of a commercial nature are now being dealt with at the rate of several hundred each year, and many of these are made by representatives of commercial firms and growers interested in the further development of the fruit preserving industry.

It has been hoped for some time past that, with the knowledge of the science of fruit preservation now available at Campden, it might be possible to arrange for the establishment of commercial courses in fruit and vegetable canning at that station, in order to supply to the rapidly growing industry trained men for supervision of the various factory processes. This project has not yet been carried through.

Campden and U.S.A.

Owing to the general lack of knowledge of the scientific principles of fruit preservation which existed in this country for a number of years after these problems had been encountered and overcome in America, the British fruit grower found himself in a relatively unsatisfactory position as regards the marketing of his produce.

In the United States the fresh fruit market was stabilised to a large extent by the enormous demand for fruit made by the canning industry, and the grower was thus less likely to be at the mercy of a slump in prices during a glut season. The American canning industry, which thus improved the agricultural position in that country, was built up as the result of much careful scientific work carried out at various agricultural research stations throughout the United States. It was with the object of similarly improving the position in this country that the Campden Research Station set out to assist the National Food Canning Council in encouraging the development of the British canning industry on a much larger scale. It also offered advice to prospective canners on the proper control of the scientific processes involved, and on the choice of suitable plant for their particular requirements.

The conditions encountered in the United Kingdom are not by any means the same as those met with in America, and the problems have thus to be studied in the light of the conditions ruling in this country. The function of the exhaust process, and the method of lacquering the can, are two problems which require careful study, and both these have been the subject of careful investigation at Campden. A prolonged series of tests on the lacquering of fruit cans has led to much interesting information being obtained, and the present programme of research includes a further extension of the work on corrosion of the tinplate and a study of the vacuum process of sealing the cans. Although the corrosion problem is not as serious in this country as in America, the

matter calls for investigation, and the various factors —both theoretical and practical—are now engaging the attention of the staff at this research station.

American Organisation.

American research is extraordinarily well organised and comprehensive. It is organised into state, regional, and national associations. State associations, primarily commercial groups, frequently obtain research assistance on all phases of canning technology from their respective state experiment stations. The National Association maintains its own research laboratories in Washington, D.C., Seattle, Washington, and San Francisco. Also, by grants of money it subsidises research at large universities, such as Harvard, Chicago, and Stanford. Efficient and admirably equipped research departments are maintained by the American Can Company and by the Continental Can Company, to study the needs of canners. A few of the largest canning companies maintain their own research departments, but ordinary private researches are seldom published. Most of the corporations engaged in canning, however, contribute to the laboratories of the National Association.

German Canning.

An account is given in the present issue by the Editor of the *Konserven Zeitung*, the German organ of the preserving industries, of the circumstances governing the present position of canning in Germany. The centre for research on containers and canning in that country is the *Laboratorium der Versuchsstation für die Konserven-Industrie* (Dr. phil. Herm. Serger), *Braunschweig*, and this station has carried out a considerable amount of work on the relations between foodstuffs and various materials used for containers, and on fruits, jams, and fish and meat products. The results have been published from time to time.

Lacquered Cans.

The various views which we published last month on the relative merits of substitutes for tinplate have drawn a spirited reply from Mr. Matthison, an acknowledged authority on lacquers for tin containers. Mr. Matthison has probably devoted more attention to this particular subject than any man living, and he has recently made a tour of America with the object of studying the question over there. His views are therefore worthy of serious consideration, and he claims that a properly lacquered tin with a perfectly homogeneous film of lacquer will successfully resist the action of every known foodstuff.

The other day we discussed this matter of substitutes with an expert on food containers, and he expressed the opinion that, since stainless steels do not impart any undesirable flavour to foodstuffs in contact with them, he believed they would be largely adopted in the future for food-canning, plant construction, and also for dairy equipment and the like. Mr. Matthison remarks that stainless steel may be ignored at present owing to its cost. Our friend, the expert, maintains that the rapidly increasing output of the metal will bring down its price.

Regarding this subject of lacquering, Mr. Hirst, in his article, makes an interesting statement to the effect that a large number of lacquered cans packed with various kinds of fruit were held in store for at least eighteen months without the appearance of a single hydrogen swell or perforation.

Distribution.

We call the attention of our readers to a paper by Mr. Innes on the extremely important subject of distribution. Mr. Innes shows that distribution today seems to be mainly from the packer to the retailer or from the packer through the dealer to the retailer. He considers that the large dealer will henceforth become a still more powerful factor for the fruit packer to consider in the distribution of his goods. The retailer has confidence in anything the dealer has to offer. The canner, and the public, are thus apparently largely in the hands of the dealer. But, supposing the canner educated the public so as to give them a say in the matter, what would be the position?

Synthetic Cod-Liver Oil.

A new product that has cod-liver oil's ability to build bones and prevent rickets, but without its offensive taste, is now being manufactured by an American firm under the Steenbock patents on irradiated foods. This product is based on the fact that ergosterol, found in the fish oil, is the substance that has the antirachitic power.

Ergosterol is also found, in an inactive state, in yeast and in certain fungi. It has been isolated from ergot oil, found in the fungus on rye. Exposure to ultra-violet rays, either from the sun or from artificial sources, gives yeast ergosterol the antirachitic properties. This activated yeast ergosterol has been dissolved in peanut and cottonseed oils and is being manufactured and will be sold as a cod-liver oil substitute. The process was developed by Charles E. Bills. The new product will not spoil and grow rancid.

Glass Containers.

Modern American housewives are ordering their vinegar in glass rolling-pins and in fancy jars that can afterwards be used as table lamps or water-jugs. The glass container people are evidently getting bright ideas. What are the tin-can people doing in this direction?

The Rôle of the State in the New Industrial Revolution

By F. W. BULLER, B.A.

Derating and Rationalisation are lucidly and ably discussed in this review-essay, in which the impact of the reorganisation of industry on Food Production is the main theme. An important contribution.

BRITISH INDUSTRY has had a decade since the war in which to take stock of its position. There has been reckless optimism, equally unfounded pessimism, but above all a reluctance to face certain facts. The combination of circumstances—political, financial, geographical, and geological—which allied with initiative and energy made us the economic master of the world in the nineteenth century was so successful that there was little time and less apparent need for any other consideration than that of "getting on with the job." There were, it is true, indications in the eighties, and increasingly so after 1900, that economic conditions were changing, but they were not taken seriously. It was the post-war slump which could not be denied. Ten years have made it obvious that Great Britain must meet the new demands if her industrial and national existence is to have any future.

The Complexity of Rationalisation.

The process of adaptation has been summed up under the one word Rationalisation. There has been a most conflicting diversity of opinion as to the exact meaning of the term, but probably the most satisfactory, and certainly the most authoritative, is embodied in the declaration made at Geneva in 1927 by the World Economic Conference: "The methods of technique and organisation designed to secure the minimum waste of either effort or material. It includes the scientific organisation of labour, standardisation both of material and products, simplification of process and improvements in the system of transport and marketing." It is obvious that the process is a most complex one which can only be attained by many stages involving all the ramifications of the industry undergoing it. In Germany, where the reorganisation has reached its fullest development in the coal, metal, chemical, and electrical industries, the ground had to some extent been broken before the war by trustification, co-operation, and the pooling of scientific and industrial knowledge. British industry was, and is, more reluctant to shake off its tradition of individualism, reticence, and conservatism. But in the new and expanding industry of scientific Food Production and Manufacture this should not be so prominent.

Its Application in the Canning Industry.

In what directions has this new economic evolution most to offer the Food Preserving Industry? It is first essential to see the main problems affecting it. The competition from overseas—this, of course, applies chiefly to the U.S.A.—is immense, solidly established, and highly organised. It is thus in a position to control the two factors which most vitally concern the food manufacturer; the insuring of a regular, adequate, high quality supply of the raw material foodstuffs, and a like output at economic prices of the essential containers. Any scheme of rationalisation on this flank of the industry is, of course, a very large one, which, in its primary stages at least, would have to be the concern of the actual tin-box makers, involving the producers of the raw material, necessitating co-operation and the ruthless scrapping of inefficient plant, going far beyond, as German experience has proved, the rather indefinite policy of output restriction and temporary agreements as to marketing zones, which, though sometimes essential and beneficial first steps, do not comprise the whole meaning of the term.

In Agriculture.

A consideration of the supply of the raw material of the actual food manufacturing business naturally touches the question of agriculture, the Cinderella of British industry. The changes which have come over our industrial system had their counterpart many years earlier in rural activity. The essence of nineteenth-century prosperity was cheap food for an increasing urban population. From 1846 agriculture faced and ultimately withered under the blast of world competition in an open market. The term rationalisation has not yet definitely been applied to agricultural reorganisation, but its principles have been adopted by our most serious Continental rivals in the shape of co-operative cultivation, marketing, and credit facilities. These principles applied here, and backed by a steadily increasing demand from a highly organised food manufacturing industry for the many products for which this country is eminently suitable, and which we now import, would do much to hasten and sustain a genuine development of agricultural activity.

The Rôle of the State.

Industry can take the direct steps to shape itself to the economic demands of to-day, but the State has its responsibilities, too. A study of the Ministry of Health's General Circular on the Local Government Act, 1929, and three explanatory statements* from authoritative exponents of the Act and what it implies for the ratepayer, should do much to convince business men and manufacturers in particular that the State is now taking a more progressive interest in industrial affairs than it has done hitherto.

* *Relief for the Ratepayer: A Popular Explanation of the Local Government Act*, 1929. By Sir Kingsley Wood, with an introduction by Mr. Neville Chamberlain and a Foreword by Mr. Stanley Baldwin. Ernest Benn, Limited. 1s. 6d.

Rating Relief. Edited by D. W. Gunston and Geoffrey Peto. Philip Allen. 3s. 6d.

"What Derating Means." Reprinted from the *Daily Telegraph*. 2d.

The derating scheme, to give the Act its popular name, is a serious attempt to free trade, and especially productive industry, of obsolete hindrances which were stifling them. A system of local government and taxation dating from the sixteenth century was an anachronism which would have been comic if its results had not been so deadly in these days of intense competition.

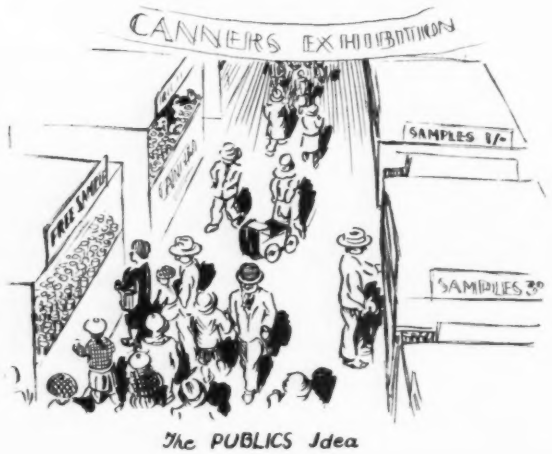
The Advantage of Derating.

A few of the more salient features of derating reform as it touches upon the Food Manufacturing Industry and its direct and indirect interests should be worth consideration. Road transport, for instance, is a matter of some importance to an industry which has interests in the rural areas. From now on road maintenance is not to be regarded as largely a local affair. The responsibility for rural road communications is to be transferred from the small rural union to the larger administrative area of the county council. Work and development will thus be possible which has hitherto been beyond the financial ability of the smaller authorities. Secondly, rail transport. The £6,680,000 in rates which were paid by the railways in 1927-1928 have been relieved to the extent of three quarters, which is to be passed on to the trader in the shape of reduced freight charges, dock, and harbour dues. These two benefits should be of much value to an industry so largely dependent on an efficient transport service, at economic rates, for the carriage of raw material, containers, manufactured products, etc. A 25 per cent. reduction in freight charges, which it is calculated will be possible through the relief extended to the railways, will react favourably on this. In effect, the reduction will go further, as the combined results of derating on railways and the coal industry will lower the cost of "industrial" coal by at least 1s. 1d. per ton. Agricultural lands and buildings, which were the recipient in 1896 of relief amounting to £4,700,000, are now relieved of all the remaining rates, totalling over £4,000,000 per annum. This measure of relief, with the benefits to be derived from lower carriage rates on fertilisers, agricultural produce, etc., and the direct relief by three quarters on productive factories, should go far to aid the producer and manufacturer. They are at least an assurance that the State is alive to the needs of industry in its adjustment to the new economic conditions.

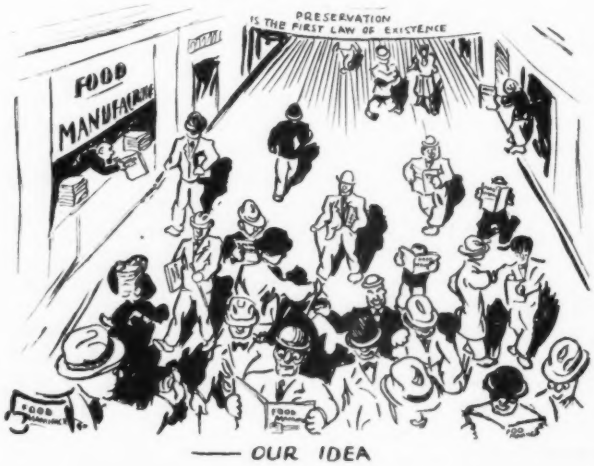
CANNED IDEAS OF CAMBRIDGE

The AMERICAN Idea

The GERMAN Idea



The PUBLICS Idea



— OUR IDEA

NATIONAL FOOD CANNING COUNCIL

THIRD ANNUAL CONVENTION

THE CANNERS and Allied Trades Exhibition at the Corn Exchange, Cambridge, on the 25th, 26th, and 27th of this month is an event of outstanding importance.

Capt. H. Leighton Davies.

H. W. Packer, Esq., Hon. Sec.

Sir Edgar R. Jones, K.B.E., Chairman of the Council.

Sir W. G. Lobjoit.

G. Salmon, Esq.

CHAIRMEN OF COMMITTEES

Executive Committee: Captain H. LEIGHTON DAVIES (Baldwins, Limited).

Canners Committee: G. SALMON, Esq. (Co-operative Wholesale Society, Limited).

Publicity Committee: Captain H. LEIGHTON DAVIES (Baldwins, Limited).

Research Committee: H. V. TAYLOR, Esq. (Ministry of Agriculture and Fisheries).

Can Committee: F. G. SCOTT, Esq. (Scott, Son and Tucker, Limited).

Fish Committee: F. J. H. CORBYN, Esq. (Mac Fisheries, Limited).

Growers Committee: Sir W. G. LOBJOIT.

Programme of the Convention

TUESDAY, JUNE 25, CAMBRIDGE.

10 A.M.—Canners' and Allied Trades Exhibition opens in the Corn Exchange.

AFTERNOON, 2.30 P.M.—*By invitation of Sir William B. Hardy.* Visit to the Low Temperature Station of the University of Cambridge and Department of Scientific and Industrial Research, and to the School of Agriculture.

EVENING, 5.30 P.M.—*By invitation of Messrs. Chivers and Sons, Limited.* A tour through their Orchards and Farms at Histon. Thence to Ely. The Very Reverend the Dean of Ely Cathedral has granted special facilities for seeing the Cathedral and will, if possible, himself address the party on the Cathedral's history. Return to Cambridge. (Route details will be given in full Programme.)

WEDNESDAY, JUNE 26, CAMBRIDGE.

10 A.M.—Canners' and Allied Trades Exhibition in the Corn Exchange.

MORNING, 10.30 A.M.—*Annual Business Meeting.* Meetings for discussion of various questions relating to the canning industry. Conducted tours of the Colleges and other places of interest.

LUNCH, 1.30 P.M.—*By invitation of Messrs. Chivers and Sons, Limited,* in the College Hall, Christ's College.

AFTERNOON.—Further meetings for discussion. Conducted tours of the Colleges and other places of interest.

EVENING.—*Annual Reception and Dance* at the University Arms Hotel (Dancing till 2 A.M.).

THURSDAY, JUNE 27.

10 A.M.—Canners' and Allied Trades Exhibition in the Corn Exchange.

MORNING.—Drive to Wisbech to the Opening of Messrs. Wisbech Produce Canners, Limited, new Pea Canning Factory.

LUNCH AT WISBECH.—*By invitation of Messrs. Wisbech Produce Canners, Limited.*

AFTERNOON.—Tour of Messrs. Wisbech Produce Canners, Limited, Fruit Canning Factory, after which the Convention will disperse.

Attendance at the Convention is not confined to Members of the Council, so it is hoped that Members will invite any of their interested friends.

REPORT FOR YEAR 1928-1929

DURING the past year the firms that are members of the National Food Canning Council had twenty-six factories in operation canning fruit and vegetables on a commercial scale, and seven factories canning fish. Progress has been made with problems of standardisation processes, research, supplies, equipment, and other matters. Special attention has been directed towards increasing the interest of the distributors and the public in British canned fruits, vegetables, and fish.

Propaganda of this general kind must continue until there are enough British canned goods displayed in the shops to advertise themselves. Even to-day, after three years of propaganda, the fact that Britain has a canning industry producing considerable quantities of canned fruits, vegetables, and fish is not known to large sections of the public. The efforts of the Council have been steadily maintained to get the fact that these products are available forcibly impressed on the distributors and the public. When it is remembered that such efforts have not had the help which substantial sums of money can give, the progress made is surprising. Every canner will agree that there is an awakening on the part of the consumers, distributors, and retailers, and that a marked widening of demand is apparent.

In this, very great assistance has been given by the metropolitan, provincial, and trade Press. These repeated references appearing steadily all over the country have, without doubt, influenced demand, and the Council will do its best to continue to obtain these facilities.

Acknowledgment, too, must be made of the help given by means of the Exhibitions provided by the Empire Marketing Board through the Ministry of Agriculture and Fisheries. During the year under review, British canned fruits, vegetables, and fish have been placed before millions of the public at these exhibitions. The Council has arranged, under these auspices, exhibits at Cardiff, Birmingham, Sheffield, Belfast, Aldershot, and Southampton, two at Manchester, and four in London. In addition, exhibits of canned fruits and vegetables have been arranged for at the principal agricultural shows throughout the country. At all of these propaganda literature, including the names and brands of all firms that are members of the Council, has been distributed in large quantities so that the volume of publicity obtained through the medium of these exhibitions has been very large indeed. The Council is arranging for a number of exhibitions to be held during 1929 and 1930, both through the Empire Marketing Board and independently, so that members can confidently count on the help they give being continued.

Special efforts have been made to get Government and local government departments to purchase British canned goods for their requirements. Every local government institution purchasing foods has been approached with practical results by producers. Similar efforts with the Navy, Army, and Air Force contracts departments have led to the inclusion of the British varieties of canned goods in their indents. The large stores in London have from time to time been urged to give a better chance to the home products, and signs are not wanting that these representations, backed up by active selling efforts on the part of canners, have had practical effect.

Final arrangements are now in course of settlement for the production by the Gaumont Company of one, and perhaps two, films of the British fruit and vegetable canning industry, which, when produced, will be shown in their regular topical film service all over the country. What this means in direct publicity needs no emphasis, as everybody knows that this is the best means of reaching millions of possible buyers.

On a smaller scale, the provision of sets of lantern slides of the industry for use by Dr. Campbell, of the New Health Society, in his lectures in different parts of the country, and by the Ministry of Agriculture's officials, can be regarded as another direct channel of propaganda. Some help has been obtained from the Empire Marketing Board in addition to the free space and other facilities given for exhibitions, both by way of issuing showcards to the retail trade for display in shops and making references in literature to British home-grown canned fruits.

The publication of two pamphlets by the New Health Society is an important feature of the efforts which have been carried on for a very long time to destroy the prejudice which has existed in the minds of the public and medical profession. These pamphlets, one of which is a report on canned foods made by a number of world famous medical men, deal effectively with that prejudice and provide conclusive answers to misleading statements about canned foods. They are very influential pronouncements on the safety and value of such foods, and their publication as a result of the Council's request for investigation is regarded as important to the British as well as the general canned foods industry.

The success which has attended the use in last season's pea pack of the new process has put the future of pea canning on a firmer basis than ever. There are a number of firms who are now so confident that a large demand for canned peas will develop in the near future that they are seriously considering establishing factories to produce them. Six firms canned peas last season, of which three did so for the first time. This season the new factory at Wisbech will be yielding a very much larger output, and as it is common knowledge that what was produced last season was not nearly enough to meet the demand, there is no doubt that this season's production will be taken up. The other firms are also alive to the possibilities.

It is satisfactory to report that interest in the canning movement is being shown by the growers. Information received indicates that fruit culture is extending. A very important meeting was held with the Council of Agriculture when the National Food Canning Council explained its case for all possible assistance from the Ministry of Agriculture. As a result, the Council of Agriculture issued a report which is bound to carry weight in agricultural and Government circles, and should lead to serious thought on the part of growers. Representations, too, have been made to the Ministry of Agriculture regarding the need for encouraging the growing of

(*Continued on page* 170.)

Modern Processing Methods in Fruit Canning

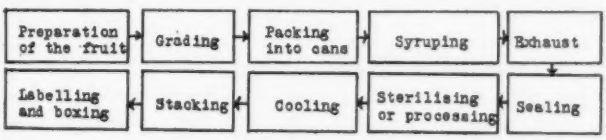
By F. HIRST, M.Sc., A.R.C.Sc.,
University of Bristol Research Station, Campden, Glos.

The following paper, which is one of those to be discussed at the Canners' Convention at Cambridge, outlines the technique of canning from the British standpoint and emphasises several features which render our problems somewhat different from those experienced in America.

MODERN METHODS of fruit canning have developed principally in America, and most of the plant used in British canneries is, with one or two exceptions, of American manufacture. It is only natural, therefore, that the methods used by the majority of canners in this country are very similar to those adopted in the United States. This does not mean that the problems involved in the scientific control of fruit canning are identical in the two countries, as there is the possibility of considerable variation taking place in certain of the most important factors involved. To mention but two examples: the quality of the tinplate, and the storage temperatures of the canned fruit. Either of these may influence the canned product to a noticeable extent. The climatic conditions in England are such that the cans are not likely to be subjected to such high temperatures during storage as they are in America. The climate may also affect the fruit, particularly if it is kept any length of time before it is canned. These points are mentioned to remind British canners that the difficulties experienced in America may not necessarily be the same as those encountered in this country, a fact which has been demonstrated in recent work carried out at Campden.

It is impossible to deal adequately with the subject of processing methods in the course of a short paper such as this, but it may be helpful if we examine briefly the reasons for adopting the various operations involved in the canning of fruits.

The procedure generally adopted in modern fruit canning may be shown in the accompanying diagram.



The fruit is prepared, graded by hand or machinery, and packed into the cans. The next process is the one of adding the syrup, but before mentioning the machines used for this purpose, it is essential to say a few words about the syrup. In fruit canning, sugar syrup is used for the following reasons:

1. It tends to retain the natural fruit flavour.
2. It inhibits to some extent the decomposition of the anthrocyanin colouring matters of the fruit.
3. It toughens the tissues, and therefore helps to keep the natural shape of the fruit during processing and subsequent transportation.
4. It aids materially in sterilisation by allowing convection currents to be set up, and thus the heat is transferred quicker to the centre of the can than would be the case if conduction alone was relied upon.

The syrup should be prepared from the best grades of granulated sugar, either cane or beet. There is a certain amount of prejudice against the use of beet sugar for canning, but experiments carried out at Campden have shown conclusively that beet sugar is equally as satisfactory as cane from every point of view. The sugar is dissolved in water to give the requisite density of syrup, and the water used should be of good drinking quality, free from any suspicion of sewage contamination, and low in mineral salts. If very hard water is used for making syrups, the latter may become cloudy after the cans are processed. Sulphates and iron salts are also very objectionable. The syrup is generally prepared in enamel-lined or copper tanks. If the former type are used, they are fitted with steam coils, whereas copper vessels may have a coil or be steam-jacketed to enable the sugar to be dissolved quickly in the water. Wooden tanks should not be used, as they tend to become impregnated with spoilage micro-organisms. The syrup should be clarified by passing it through flannel, muslin, or fine brass wire gauze before it is used to fill the cans.

Density of Syrup.

The best strength of syrup to use is one which brings out the full flavour of the fruit without making the product too sweet. In the United States definite densities or percentages of sugar are recommended for the various grades into which it has been found desirable to separate the fruits, and with the highest grade of fruit the heaviest syrups are used. In England definite densities of syrup for even the different types of fruits are not used, but each individual canner uses the degree of syrup which, in his opinion, gives the best results. It is a debatable point whether it is advisable or not to use very heavy syrups merely because they are commonly present in imported canned fruits. Our English fruits possess very delicate flavours, and the very heavy syrups used in some cases tend to mask the flavour of the fruit. Fashion to-day appears to have a determining influence on the diet, and canned English fruit which has a marked fresh fruit flavour may be likely to find a better sale than that in which the sweetness of sugar predominates.

Syruping Machines.

There are various types of automatic syruping machines, and most of them operate very much on the same lines. As the can enters the syruping machine it is lifted by a cam action, which in turn causes a valve to open and syrup from a small reservoir to enter the can, the displaced air at the same time escaping through a vent. The principal syruping machines used in this country are the Anderson-Barngrover, the Ayars, and the Peerless. These vary somewhat in the design of the valves, and in the methods of changing over from one size of can to another. Some canners prefer one type and some another, but all appear to give fairly satisfactory results.

Exhaust.

This term is used in fruit canning for the operation of heating the cans and contents before they are hermetically sealed, and it is interesting to note that in the earliest records of fruit preservation in this country, exhausting was practised. At the present time the most important object of exhausting is to remove air from the cans before they are sealed, and thus to produce a vacuum after the cans have been sterilised and cooled. The vacuum causes the ends of the can to be drawn in, and the concave ends thus produced indicate to the prospective purchaser that the contents of the can are sound. Exhausting serves another useful purpose in that it prevents over-filling of the cans. The heating causes the can contents to expand, and as the contents contract on cooling sufficient head space is left. When open top cans are sealed at too low a temperature, they may become springers or swells if subsequently subjected to a fairly high temperature. Several samples of springers sent to the Research Station for examination have been found to be due to overfilling. The internal pressure set up in a can during sterilisation will vary according to the difference in temperature at which it was sealed, and the temperature attained in sterilisation; the higher the temperature at which the can is sealed, the less will be the internal pressure in the can, and the greater will be the vacuum.

In America, tremendous losses result every year from what are known as hydrogen swells and springers. These are due to the action of the fruit acids on the metal of the can producing hydrogen gas in sufficient quantities to cause the ends of the can to spring or to become convex. An extreme effect of chemical action on the tinplate is the production of perforations or pinholes, as they are often called.

Removal of Oxygen.

It has long been known that corrosion of the tinplate is greatly accelerated by the presence of oxygen in the can, and the object of the exhaust process is to remove this gas as far as possible, not only from the head space of the can, but also from the intercellular spaces of the fruit. It has been shown in America that the most satisfactory method of removing the residual oxygen in fruit is by employing a long exhaust at moderate temperature rather than a short exhaust at a high temperature. Unfortunately, even with the most efficient methods of exhaust there is always the possibility of corrosion taking place through the agency of the natural colouring matters of the fruit, but this danger may be reduced to a minimum if care is taken to drive off the air at this important stage of the canning operations.

In this country we do not appear to suffer very seriously from hydrogen swells and springers, but most canners have at some time had a few of their tins spoiled through these causes after the cans have been in store for a long period. As the present address is concerned with the practical rather than the theoretical aspects of canning processes, it is not possible to describe in detail the work which is being carried out at Campden in connection with these problems. It is of interest, however, to note that in an investigation on the protective action of various types of lacquers undertaken in 1927, a large number of the cans packed with various kinds of fruit were held in store for at least eighteen months without the appearance of a single hydrogen swell or perforation. No special care had been taken to remove the last traces of air from the cans, but the lacquer coating in every case had originally been sound. This leads to interesting speculations on the nature of the corrosion problem as experienced in this country, and the relative importance of the various factors involved. The practical aspect of the case is also being studied at the Research Station in tests on time and temperature of exhaust, and on the use of a vacuum closing machine for the purpose of removing the air from the cells of the fruit. Storage conditions are also the subject of investigation.

Exhaust Boxes.

There are two types in use in British canneries. In the Ayars pattern the cans are fed from the syruping machine in a straight row on to a disc, which revolves and places the cans on a carrier chain. The disc, having the greater speed, fills the chain solid with cans, and the latter are then carried through the box, the bottom of which is filled with hot water. The track inclines gradually from each end, so that the lower part of the cans pass through the hot water. The upper half of the box is heated by means of a closed steam coil. The cans pass out of the exhaust box on to another disc, which passes them on singly to the closing machine.

Another type which is largely used in modern canneries is the Anderson-Barngrover. This consists of a rectangular box in which there are a number of rows of metal discs. These inter-mesh, and the cans are guided through the hot water or steam by means of curved iron bands. A water exhaust of this type is very efficient, as the cans are carried through the hot water along the whole of this path, and the water reaches almost to the top of the can.

In both types of exhaust boxes described above, temperature controls can be fitted so that all the cans get exactly the same heat treatment whilst passing through the exhaust box.

Sealing.

From the exhaust box the cans pass at once to the sealing machine, which spins on the lids. There are many different makes of automatic sealing machines, but the principle of sealing is the same in almost all the types. The actual sealing of the cans is carried out by means of two small rollers which are brought into operation one after the other. The first roller folds the edge of the lid round and under the lip of the can, and the second roller tightens the joint. Sealing the cans is one of the most important operations in canning, and whichever type of machine is installed, its working should be thoroughly understood by the operator or by the foreman in charge of the plant. The latter should also be able to examine a seam and know if his machine is working properly.

The Process of Sterilisation.

The success of any method for the destruction of micro-organisms depends on killing the cell protoplasm. This is susceptible to certain chemical and physical agents, and of the latter, heat has been found to be one of the most effective. Heat alone, if applied long enough, will destroy the protoplasm, but a combination of heat and moisture is far more deadly. In practice, the contents of the cans are covered with a sugar syrup, and the heat thus acts in the presence of moisture. The canning process is therefore a method of sterilisation depending on moist heat. Absolute sterility is what the canner desires, but this is not always achieved. The heat treatment given, however, must be sufficient to kill —or at least inhibit the growth of—micro-organisms. It has another purpose, and that is to improve the texture and flavour of the product by cooking.

It should be clearly understood that in sterilising the cans after they have been closed, the canner is concerned with killing the micro-organisms originally present on the fruit, and also in the water used in making the syrup. This is done by heating the cans for a certain time at a suitable temperature. It is thus a time operation, and as a general rule the higher the temperature used, the shorter the time of exposure. The times and temperatures used in our canneries have been adopted more as the result of experience than experiment. They have been arrived at under average conditions, and under such conditions give satisfactory results. It is quite conceivable that if there are more bacteria or yeasts present than is usual, the times and temperatures used may not be adequate. Realising this, it is easily seen why a large percentage of brown cans may result even when the heat treatment given has normally yielded a satisfactory pack. It may be that some steps in the canning operations have been neglected, or the raw material may have been allowed to lie about too long before it was canned, or some of the produce may have been over-ripe with some of the juice exuding, in which the organisms could rapidly multiply. There would thus be an undue strain put on the processing, and the set time and temperature might not be sufficient to insure sterilisation.

Infection of Raw Material.

It thus behoves the canner to keep down infection of the raw material to a minimum. This may be done by having the fruit delivered at the factory as soon as possible after picking, and in as dry a condition as possible. Careless handling of chip baskets may bruise or crush the fruit, making it easier for the micro-organisms to multiply. Delay between filling the cans and sealing them, or a delay in sterilising the cans after they have been sealed, tends to increase the number of organisms. Another important source of infection is dirty apparatus. Thus it is a sound scheme to have a thorough clean up after each day's run. Another very likely source of contamination is a wooden syrup tank, as it tends to get impregnated with micro-organisms. Spoiled cans containing produce should not be allowed to accumulate around the canning plant, nor should they be dumped near the factory, as they may be a source of infection of just those organisms which have caused spoilage, and which have survived the heating process. Diseased fruit and vegetables should be removed and either burnt or buried. More hygienic methods have contributed largely to the health of the community, and they should be applied to the cannery.

It is a well-known fact amongst canners that some fruits are more easily sterilised than others, and that fruit as a whole requires far less heat than vegetables. This is largely due to the difference in chemical composition. Fruits invariably contain organic acids, and these assist the heat to such an extent in processing that it is not necessary to heat the cans to a higher temperature than that of boiling water. In sterilising fruits which are very low in acid, more reliable results can often be obtained by adding a little tartaric acid to the syrup.

Automatic Cookers and Coolers.

In modern canning factories, automatic cookers are now used. These are known as continuous variable discharge cookers. In this type of machine, the heat penetration is remarkably uniform, and the contents of the cans quickly reach an effective cooking temperature. With these machines it has been found that most products can be safely processed very much quicker than is possible with the open tank method, and a more uniform product can be obtained. The length of cook is not determined by regulating the speed at which the machine is driven, as this always remains the same, but by opening one of the small doors which are placed along the side of the cooker. When a product is being processed which only requires a short cook, the first or second door is opened, and the cans discharge there, whereas for a longer cook one of the doors further along is opened. Each door corresponds to a definite time, and cans of fruit can therefore be cooked for from five to twenty minutes, or longer if necessary.

After cooking, the cans pass through a similar machine to the above, but this time they revolve through cold water to cool them rapidly. Quick cooling plays an important part in the appearance of the product. It prevents over-cooking of the fruit and thus tends to keep the fruit whole, whilst it also helps somewhat in keeping the colour of the product.

Abstracts of Convention Papers

The following are some further abstracts of papers, which will be discussed at the Canners' and Allied Trades Exhibition at Cambridge.

Fruit and Vegetable Production for the Canning Industry

By H. V. TAYLOR, A.R.C.S., B.Sc., O.B.E.

(*Commissioner of Horticulture, Ministry of Agriculture and Fisheries.*)

H. Taylor, A.R.C.S., B.Sc., O.B.E.

THE English Fruit and Vegetable Industry has been built up to its present huge proportions by men who had their eyes on the fresh fruit and vegetable market, and in consequence the make-up and organisation of the industry are biased in the direction of the public market and against the successful serving of a canning industry. Except in a few, and what must be regarded as exceptional instances, the two industries cannot be well served by the same growers, for the varieties of produce that are suitable for the market are often not desirable for canning purposes, and, in any case, both the market and the Canning Industry need the fruits of the higher grades, so that in grade requirements the two demands are similar and not complementary. In fruits the Canning Industry will need some apples—a requirement that can be met without any adjustment or difficulty, for in the Bramley Seedling the canner will find an apple unsurpassed for canning or for any cooking purpose. The acreage to this variety is very considerable and supplies suitable for canning purposes will exceed the demand for very many years. If the Canning Industry so desired it would be possible to define in words a definite grade of apples suitable for canning purposes.

With plums the position at present is less optimistic. The grower usually grows Rivers' Early and Czar to produce an early crop, Victoria and Pershore for the mid-season variety and Monarch for a late. Whilst all these plums of varying colours are unsuitable for dessert, culinary, and for jam-making, they are by no means all desirable for canning. For the latter purpose, the blue plums, Czar and Monarch, are of little use. The yellow Pershore is suitable only in the sense that it cans well and keeps a good colour, for the flavour is lacking and the canned product lacks any distinctive characteristics. The Victoria, on the other hand, is, for canning, a plum de luxe; it is large, of good colour, and much improves in flavour when canned in syrup. The flavour of the canned Victoria is unique and pleasing, and this may well be styled the Canner's Plum.

The canner needs Victoria plums of certain grades and so it may be necessary to draw up a definition defining a canning grade—a task of no great difficulty.

Space will only permit of a discussion of one other fruit—the Strawberry—and the chief complaint here is that the supply is very far behind the demand. The Chairman of the Food Canning Council has estimated the deficiency as large as a thousand tons. Strawberries present no very great difficulty, for, fortunately, the varieties mainly grown for dessert—the Royal Sovereign and Sir Joseph Paxton—are highly suitable for canning, nor need the canners take a very pessimistic view concerning supplies, for as soon as a fair acreage of sound plants have established an increased supply should be assured. The present troubles with the strawberry crop are due largely to the very rapid plantings that occurred after the war, when good runners were scarce and very poor plants had to be used. During the war the strawberry was regarded as a luxury crop, and in consequence its acreage was forced down from 23,374 acres to 13,143 acres in 1918, a decrease of 10,231 acres. When the war ended the acreage began to rise, slowly at first, but very rapidly in 1922, 1923, and 1924, when in the last year the acreage reached as high as 33,619 acres. Thus the increase from 1918 to 1924 was as much as 20,476 acres and no less than 12,074 acres from 1922 to 1924.

Normally, growers when planting secure strong runners off maiden plants, for these are said to give the best results. Even taking into consideration the fact that new beds were being set out almost continuously, those experienced in strawberry culture will realise that a sufficient number of really strong, good, healthy runners were not available for planting up new land at the rapid rate experienced in the years 1922 and 1923, and in consequence, many inferior, weak, and often unhealthy runners were used instead. Many of them had no chance of being successful in producing a crop and have simply given unsatisfactory results since. The indiscriminate plantings in these years have much to do with the trouble to which the strawberry beds have been subject and the poor yields that have been experienced. The worst point has, however, been passed, and it is possible to view the future with more optimism.

The canner of vegetables has a new field open to him and it is unlikely that he will find the present vegetables suitable for his purpose. They exist, however, in other countries, and by the co-operation of the canner, the growers, and the Department of Agriculture it should not be very difficult to organise a production of vegetables specially for the Canning Industry.

It would seem, therefore, that by organisation an industry can be created to produce the kind and class of produce that the canner needs, and, if necessary, a grade for canning produce can be defined to make business simpler and less prone to misunderstandings.

The Export Trade

By F. J. H. CORBYN, O.B.E.

F. J. H. Corbyn, Esq., O.B.E.

I HAVE been asked to initiate a discussion on "The consumer's viewpoint and distribution in its broadest aspects" in so far as the subject affects the Export Trade of British Canned Foods.

No one will join issue with me when I say that so far as the consumer's viewpoint is concerned the world bias is in favour of British goods, because British and Quality are synonymous terms. I am not concerned with individual and minor anti-biases but am treating the subject, according to my terms of reference, broadly.

However pleasing this may be to our national *amour-propre* the fact that Mrs. X., in some distant part of the world, likes British canned goods cuts no ice if she cannot get them. People have to be contented with what they can get.

The subject of more immediate concern therefore is Distribution. Even Publicity, aimed to extol the virtue of our wares, must depend upon Distribution, as it is futile to expound the merits of the unprocurable.

The merchant's co-operation is therefore our goal. He, in the case of introductory lines, often takes up the attitude that he cannot expend his salesmen's time, or in other words his money, in pushing new lines against what he calls "self sellers." It is an old tale. Eve probably told the Serpent that Adam was so set on figs that it would be useless to try and change him over to a diet of apples. The three essential factors making it worth while for the merchant to give you his goodwill are quality, the right price, and service. The quality is well taken care of by the producing side of the industry. Prices find their own level and are not inseparable from the other two factors. When, however, it comes to service we have, again speaking broadly, some way to go. Although we do not worship our ancestors, we sometimes make a fetish of their methods, but we are learning and improving.

To get distribution we can lay down no hard and fast rule. If we do, we shall fail. Each territory has to be treated as a separate entity because it does not care a rap for the idiosyncrasies of its neighbour. Broadly speaking, we must select our representatives carefully and having done so we must back them up. They, knowing the local conditions, can best persuade the

"sticky" merchants to give our goods a trial. How often, however, do we hear of cases where the representative, having used all his salesmanship to secure a trial order, is let down by his principals on this side. In short, the service has failed.

It is difficult enough to get in at the door of the World's market, but the exits are innumerable, and I suggest that far too great a proportion of the exits are crowded with the slack service executives of all nations.

Good Service embraces the following.

Ready and intelligent interest in enquiries. The other fellow is not necessarily a congenital idiot because he has an idea which is new to you.

Sympathetic contact with your agents and buyers. They are your best friends.

Bright, original, and intelligent letter writing. Cut out "Yours of even date to hand, same has our attention."

Scrupulous attention to shipping instructions.

Rapid execution of orders. Rapid fulfilment means quicker consumption and the much wanted repeat order.

One could expand the theme considerably, but it is unnecessary. What we have to do is to develop a first-class sales and service cult of our own. There is no need slavishly to follow the methods of other countries. They can be improved upon by taking a little thought ourselves.

If only overseas buyers can realise that, in addition to British goods being the best in the world and British merchants second to none in integrity, British merchants never let you down, then the game is more than half won.

I hold that the "solar plexus" of service is here, in this country. It is essential, therefore, that the nerve centre should be vigorous and healthy because it influences, according to its capacity, those delicate and very sensitive nerves at the distant selling points and affects accurately the success or otherwise of marketing.

The Consumer's Viewpoint: Distribution in its Broader Aspect

By F. WILKINSON.

(Co-operative Wholesale Society, Manchester.)

F. Wilkinson, Esq., C.W.S., Manchester.

IT will be admitted that the British Canning Industry has to-day an unprecedented opportunity for promoting the sale of its products, and I feel it to be the right perspective to this end by considering first and foremost the *consumer's* viewpoint. All efforts, whether on the part of the manufacturer or distributor, must be directed to the consideration of the ultimate destination of his products.

There are three essentials which the British public demands—QUALITY—PRICE—SERVICE.

The question for those in the industry, therefore, is, Are they giving these essentials? It is not sufficient to say we can do as well as the foreigner. We must be able to lead and not be content to follow.

Certainly there is to-day more than ever before a national pride which gives a prejudice in favour of British productions over the imported article.

The inestimable efforts of the Empire Marketing Board have stimulated this, and the National Mark Scheme of the Ministry of Agriculture will go far to intensify this preference for British productions.

It is for the industry, therefore, to produce the commodity worthy of the name. The consumer will always demand this; hence QUALITY must always be pre-eminent.

There is, I know, an economic factor which to-day must be considered—viz., the restricted spending power of the consumer, and this is a great temptation to the manufacturers to produce an article to meet the exigency of the situation, but is it the wisest policy? Any commodity bearing the British hallmark must be above suspicion and certainly must not be inferior to the best brands of the imported variety. It is my firm conviction that the British producer must place this as a first essential axiom if he is to command and retain the confidence of the British consumer. At the same time the question of price is of serious moment.

In the past we have been so accustomed to speak of the law of supply and demand as a regulation of prices that it is even now difficult to imagine any other material consideration. To-day, however, this order of things is often reversed. Given the right article at the right price and producers have little difficulty in disposing of their commodity. The price from the consumer's point of view is the determining factor, and the writer has in mind several instances where British canned products retailed at a certain price found a ready sale, but to countenance even a slight increase would have had the effect of immediately arresting the disposal of the goods, with consequent disaster to the stocks available.

In addition to QUALITY, therefore, the producer must of necessity keep in mind the question of price to meet the economic position of the average consumer. The latter will always appreciate a reduction in price, but will never countenance a deterioration in quality.

It is not my purpose here, in this short address, to speak of the merits or demerits of the multiple or co-operative store, one against the other or either or both against the small trader. I am at present only concerned in the consumer's viewpoint, and the choice of medium from the producer to the consumer must rest with the latter.

Whatever system is deemed the best for the consumer, distribution must of necessity aim at reducing to a minimum the charges involved in such service. The question of transport is a vital one, not only from the point of view of its immediate effect *on prices* that such transport involves, but also on the distributors' warehousing facilities. Quick transport is the order of the day.

From the Factory to the Counter is the ideal which eliminates all those intermediary charges and delays which affect the sale of our commodities and prevent the constant circulation of money, thus impeding to some extent progress of the industry.

Producers and distributors ought to be in constant personal touch with their retailing friends, ready at all times to study their requirements, requirements sometimes peculiar to their own districts.

They should never despise friendly criticism.

The retailer knows what his customer wants. He is seldom unreasonable and often can give very practical assistance to the producer in pointing the way to meet the demand.

"The recognition that things might be better ordered, and *must be*, is the starting-point of the spirit that makes for progress."

With the constantly improved methods of production, coupled with systematic study of the consumers' viewpoint and an intelligent anticipation of their potential requirements, with distribution organised to a degree where excessive handling and waste are eliminated, it is possible to visualise production on such a scale as to be competitive with any imported article, and the British consumer will reap the benefit in reduced prices, which again will react to the benefit of the manufacturer.

The Canning of Herrings.

By A. McNAB.

(Aberdeen Preserving Co., Ltd.)

THE principal fish used in the canning industry is the well known herring. Several other kinds of fish are also utilised, but in much smaller quantities, and it is the purpose of the writer to confine his remarks to the canning of the herring.

Unfortunately for the industry, the business has been declining of late years, and as an instance of this fact it is recalled that in Aberdeen pre-war there were nine canning factories. To-day there are only three. The war is responsible for the change. During that period competitive articles took the place of the canned herring abroad, and the recent development of fisheries in overseas markets has helped to make the marketing of canned goods more difficult. Perhaps the fish canning industry in this country has not kept pace with the highly organised fruit and other canning industries in America. This, to some extent, is accounted for by the fact that the canning of the herring is seasonal, and does not, in the same way, present the opportunities which industries do that have much longer seasons, or even have the factories working all the year round. It was just shortly before war broke out that automatic seaming machines were brought into universal operation. Previous to that, many firms were still inclined to use the more old-fashioned and expensive method of closing tins by hand soldering. The style of tin universally used in the fish packing trade is the oval squat tin which has been found to be the best shape and style of tin for packing the class of herrings obtained around our

coasts. Perhaps this, to a certain extent, has mitigated against the universal adoption of the can-making machinery used for the making of tall tins in the American trade. Unfortunately, all attempts by the trade itself have failed to bring the different canners together with a view to discussing their own problems—with the consequent result that all factories pursue methods of packing based upon their own personal experience. The National Food Canning Council is endeavouring to bring the British canners together in the same way as they have done for the Fruit and Vegetable Packers with such satisfactory results, and it is hoped that ultimately a closer and more co-operative spirit will prevail in the canning industry in order that they may give themselves the chance of furthering the interests of their particular industry.

During the summer and autumn months the herring is in its best condition. On the east coast of Scotland the herring is in its prime during June, July, and August, and in England during October and November. In other parts of the country, such as the west coast of Scotland, for instance, and Loch Fyne, good herrings are to be obtained nearly all the year round, but the cost of transit over long distances makes the ultimate cost of fish delivered into the factory very high. Canners have, consequently, to devote themselves to working up herring in its absolutely fresh state during this particular season. In order that the herring may be prepared in its very best condition it is essential that the fish be gutted and thoroughly cleaned as soon as possible after being caught. This is specially so during the summer months when the weather is warm. The general method is to salt or pickle the herrings immediately after being cleaned, and as soon as that process is accomplished, they have to be put into cans and cooked as quickly as possible so that the herrings will not deteriorate in the least.

Probably more attention is being paid to detail now than before, and new methods of catching herrings are helpful towards this end. The steam drifter has revolutionised the catching side of the industry. Herrings are now brought to port by this means of quick transit at a very early hour—catches of herrings being landed often at six o'clock in the morning. This enables the canner to get his herrings prepared in thoroughly fresh and prime condition—gutted, cleaned, and processed that day. Before the advent of the steam drifter and in the days of the sailing vessel, it was quite common for the first herrings to be landed towards the close of the day, when the gutting and preparing could only take place either during the night or next morning.

Recently, a new machine has been put on the market for vacuumising purposes. This machine expels the air from the tin previous to seaming. This is a step further in the advance of progress over the previous method of expelling air through the "brog" hole, which was accomplished by heating the tins in the retort and expelling the air through the "brog" hole, then sealing the hole up by soldering. The canning and processing is now generally done under steam pressure in large ovens or retorts. This method has almost entirely superseded the older method of processing in water-baths. Various canners have their own methods of processing and sterilising—the time generally applied, according to the class and quality of the herring, being from sixty to ninety minutes, working at a steam pressure of from 3 lbs. to 10 lbs. Great care has to be taken in the processing in order that the juices will be retained in the fish and not expelled as a liquid into the tin. Cooking too quickly or cooling too slowly often produces this. The fish have to be kept whole without any appearance of falling away when the tin is opened. It is desirable that the herring be presentable at the table as near its fresh cooked state as is possible. That, of course, is the fundamental business of the canner, and it must be admitted that in many ways he has attained a very high degree of efficiency.

Herrings in tomato sauce and kippered herrings are delicious articles of food. That they are not more popular in this country is on account of supplies of herrings and kippers being easily obtainable in a fresh and uncooked state in any town or village in the British Isles. Consequently, the canning trade has to depend principally for its volume upon the overseas markets. Although the present method of packing, certainly improved and perfected, has been carried on for the past thirty years, it does not follow that improved methods of packing could not be devised. Large tins of the 1 lb. and ½ lb. size are the most economical from the family point of view. Within recent years, with the advent of the large motoring public, snack delicacies are now being sought after which would never have been thought of even as recently as ten years ago. Perhaps it is to this new line of thought that the fish canners will have to apply their minds. The Americans have done so with the greatest success in their own lines of the canning industry. Norwegian fish-canners have also shown great enterprise and have extended the fish-canning industry to a considerable extent. This has been achieved principally by co-operation of all working together with a common aim in view. The number of fish-canneries in this country is small, and perhaps with co-operation they may be able, through the National Food Canning Council, to come together and discuss the various problems and new methods of packing from an entirely new and disinterested point of view.

The Production of Fruit for Canning

By W. P. SEABROOK.

(W. Seabrook and Sons, Ltd., Chelmsford, Essex.)

W. P. Seabrook, Esq.

ONE must realise at the outset that canning conditions in this country are radically different from those obtaining in the U.S.A. and Canada. In those countries crops are produced for canning, and only for canning. Local markets for the bulk of such fruit are either already over-supplied, non-existent, or difficulties of transport prohibit marketing the fruit in the ordinary way fresh to the consumer.

The canneries there are thus assured of supplies, there being no other outlet, and growers cater specially for them and standardise their production. The fruit is grown in comparatively close proximity to the factory, and the two parties—canners and growers—are in close and undisturbed contact.

In England the conditions are almost exactly the reverse. An essential condition for successful fruit canning is that the fruit must be of the very best type, properly graded, in prime condition, and of standard varieties which are suitable for canning.

Unfortunately for our budding canning industry these conditions are also exactly what our fresh fruit market needs, pays the highest prices for, and can never get enough of. The canners are in direct competition with the fresh fruit markets. Road transport, improved packing, smaller containers, standardisation of varieties, and the increasing consumption due to popular dietetic teaching are all factors which are working in favour of marketing fresh to the consumer and are factors which are raising the general level of fresh fruit prices.

There has been a steady rise in price for all standardised fruit so marketed, and until the fresh fruit markets become glutted with first-grade fruit there does not seem to me much chance of development of canning unless certain steps are taken by both growers and canners. There is never likely to be a shortage of low-grade fruit unless legislation prevents its exposure for sale; therefore, the jam-maker is not likely to be short of supplies, because, provided the fruit is comparatively sound and clean, it makes perfectly good jam, its only fault being that it is too ripe or too broken for canning. Also most growers of soft fruits contract with jammers for part of their crops so as to insure an outlet in the event of weather or other conditions making sales on the open markets difficult.

Therefore it appears to me that canners have to face the position squarely and mould their policy accordingly. Canneries should be established in the fruit-growing areas, as it is here that there is most likely to be a large supply of first-grade fruit which for various reasons is not likely to be placed entirely upon the fresh fruit market. Secondly, I think canners will have to give definite contracts with growers for a period of years on a mini-

mum price basis, to be increased according to general price levels in any given year or every year. This "plus" price might be decided by such an outside disinterested organisation as the Ministry of Agriculture, who would, by reason of their Statistical Department, be cognisant of general market conditions and who would have the best interests of both canners and growers at heart. Thirdly, there must be created between canner and grower a firm foundation of confidence and utmost integrity, both being so much dependent upon each other. Fourthly, canners must, I think, avoid price comparisons between overseas canned goods and English and overcome or defeat competition from overseas, because our product is undoubtedly infinitely superior, at any rate, with such fruits as strawberries, raspberries, black and red currants, blackberries, plums, and especially damsons. It is futile to attempt to compare prices of these fruits, which are little grown in America or, if grown, are markedly inferior mainly on account of climatic conditions. Probably they will always beat us with peaches, apricots, and pears. It appears to me better that we should develop our own peculiar fruits in which England excels, create a sound market, and fix such prices as will allow a fair profit to grower and canner, obtaining our market for such special fruits by judicious advertising. There is no comparison between such fruits as American peaches or pears and English raspberries or strawberries, and there need be no price comparison if the potential market is properly developed. As regards contracts, we have the sad spectacle of the bacon factories. They have never, I think, been able or desirous of giving long term contracts to pig producers, with the result that great fluctuations in prices occur from day to day; producers never know what price their baconers may fetch at six or seven months old, so, if the porker trade was good, the pigs went to market at three or four months and the bacon factories got no pigs.

Producers must, I think, be encouraged to prepare years before the fruit is produced, know within a reasonable margin what that fruit will fetch, and so be enabled to standardise their produce in accordance with the requirements of canners. Standardisation of produce is as necessary for fruit as for pigs, and no stable industry can be built up in either product until more stable conditions of sale are established. The fresh market conditions are at the moment remarkably stable for first-grade fruit. Canners must be in a position to make the canning market equally firm. The grower who sets out to cater for local canneries has his obligations, and they are quite as essential as those of the canner. Firstly, as is well known, only first-grade fruit is fit for canning. Secondly, he must grow only those varieties which are suitable for canning. The fruit must be in as good condition as if it was destined to travel by rail a hundred miles, and as if it was intended for a high-class fresh fruit market. Therefore he must be assured of as good a price as he could reasonably expect in such a market.

The matter of mutual confidence and agreement as to condition on arrival at the factory is the most difficult point in the relations between canner and grower, I think.

Probably the only method is for canners to have representatives stationed in fruit areas. They could visit contracting growers while fruit is being picked and pass consignments on the spot. I know the matter is not so easy as with sugar beet. Analysis and other conditions are easier arrived at with this product, whereas a rain a day or two before raspberries, for instance, are picked may make all the difference from the canners' point of view of their suitability on arrival, and which might be a condition which the grower has no means of detecting or preventing on despatch. Also the matter of quantities is a most difficult one. Weather conditions a day or two before the crop ripens or a rainy or droughty period during the picking season may enormously affect quantities or the sample. Contracts must be sufficiently elastic to allow for such variations.

As regards varieties, it appears that most of our most prolific sorts of the various fruits are suitable for canning. If the relations between growers and canners can be placed upon a sure basis of mutual confidence there is enormous scope for extension and an excellent prospect of replacing a large amount of canned fruit, now imported, by English fruit, and to my mind the best way of bringing this about is not on price but on quality competition. As it develops, and when conditions make it desirable, the application of the National Mark and a share of the advertising activities of the Empire Marketing Board would probably hasten the firm establishment of the industry.

To summarise, I think standardisation of varieties, quality, and condition, coupled with stabilisation of prices, are the twin pillars to be erected for the support of an industry which might go far towards that restoration of rural prosperity which is so sorely needed to-day, not to mention the provision of sounder food for the multitude.

Canned Fruits and their Distribution

By G. H. ENNIS.

G. H. Ennis, Esq.

HUMAN beings may be traced in almost any part of the globe through the tin cans which they leave behind them. Certainly anywhere in North America and Great Britain this is especially so; for wherever people have spent a day, there you may find this sign of their occupancy. To-day the retailer receives from the wholesaler the larger portion of his food supplies in a package, which is transmitted unbroken to the consumer, and of all these sanitary devices the tin can is probably the most significant and the most universal; so that the public of to-day in their tremendous consumption of tinned fruits, vegetables, fish, meat, and milk owe a world of gratitude to Thomas Kensett, who in 1825 secured a patent for the use of tin cans in his food preserving factory somewhere in the Eastern States.

The canning of fruits and vegetables is at the present time not only one of the most important industries of California, but also of Australia and Canada, and at last seems to be well on the way to become one of the most important of British industries. Time flies, for it is only some 55 years ago that canned fruits were first introduced from California into this market through the enterprise of Mr. C. C. Behr and A. W. Latham, founders of the well-known and esteemed brokerage firm of A. W. Latham and Co., and as one can also justly say founders of the huge canned goods distributing business of Great Britain.

Their first shipment to arrive consisted of some 5,000 cases, and it was only after the utmost difficulty they disposed of these to the large Eastcheap dealers for distribution among the wholesale grocers. Yet it is from this small first shipment we owe our present imports of some 5,000,000 cases of fruits, made up of approximately 3,500,000 cases from California, Oregon, Washington, and Honolulu, 1,000,000 cases from Singapore, and 500,000 cases from Australia, Canada, and other countries.

Distribution in all producing countries seems to have developed along the lines of sales from the packer to the wholesale grocer and from the latter to the retailer, each party in turn taking a profit. *Californian packers* sell through broker agents in all large American cities to the wholesale grocers, multiple and departmental store institutions. Many retailers, however, in order to be competitive with the multiple stores, combine together for block buying and with the keenness of competition among the packers are able to secure their supplies direct from the latter instead of buying through the wholesale grocer. *Australian packers* fix definite wholesale and retail grocers' prices for their fruits, which are maintained by agreement whether the retailer is sold and supplied direct by themselves or sold and supplied by the wholesale grocer. *South African packers* practically sell entirely through the wholesale grocer, but instead of naming him an opening price as in California they quote the price he must agree to sell at and give him discounts as a profit.

Prior to the war the seven or so Californian packers with one exception, selling here approximately some 1,100,000 cases of fruit, sold through their London and Liverpool broker agents only to the dealers of those cities, and were in many cases accustomed to selling the latter *practically a whole year's supply*. Sales in such large quantities required heavy finance, and even had the packers desired their brokers to go beyond the dealer to the wholesale grocer, very few of the latter had either the finance or the distribution even to warrant purchasing at one time in documentary quantities, which approximated in those days some 1,200 cases, the carrying capacity of an American railroad car. The multiple store institutions were not at that time such a powerful factor in food distribution as they are to-day, and they too, with about two exceptions, who secured direct from the packer, bought their supplies as required from the London and Liverpool dealers. Consequently, with the exception of the fruits imported by Messrs. Libby, McNeil, and Libby, who 25 years ago opened up their own distribution here and sold direct to the wholesale grocer and larger retailers, practically the whole of the fruits imported, and also other canned goods, were sold exclusively by good solid brokerage houses representing packers to the dealers (or first to wholesalers), and were distributed by the dealers or wholesalers to the wholesale grocers and larger retailers.

Dealers were in those days all heavily capitalised concerns with very capable and highly organised selling staffs, and as they had been allowed to go on for years doing practically the

whole marketing of canned goods, *they naturally developed the idea that the wholesale grocer and the larger retailer were their own special customers and should not be encroached upon by the packer.* Undoubtedly the packer abroad owes them a world of gratitude for the spade work they have done in popularising canned fruits here, and no one possessing a sense of fair-mindedness can deny they were fully entitled to look upon the distributing trade of England as their own special preserve. Dealers who can in 45 years develop canned fruit imports from nothing to some 5,000,000 cases surely are expected to develop definite ideas as to who are their customers and who are not. Prior to the war and during the war, then, we had distribution in England following definite lines.

1. From the packer exporter to the dealer importer.
2. From the dealer to the wholesale grocer and large retailer.
3. From the wholesale grocer to the retailer.

The canning and growing of canning fruits proved a very profitable business during the war both in California and Australia, and as a result new packing institutions have since sprung up and fruit production has more than trebled until to-day *we are faced with over-production.* Each new canning institution has sought representation in Great Britain, and some of the business of the old established dealers, loyal to the older-packing institutions, could not satisfy every newcomer, and there have been many disappointments. Combines of packing institutions have been developed abroad and, with increased financial strength, leading packers have shown a desire to popularise their own brands here instead of allowing dealers to market under other brands. Two other leading American institutions have followed Libby's lead and are doing their own distribution independent of the dealer. Broker agents, whether voluntarily or under pressure from their packers, have solicited and accomplished business with the leading multiple stores selling them at the same price offered the dealer, and the larger dealers, meeting the attack of the packers and the brokers, have materially extended their connections with the retailer until to-day some of them are selling practically every one worth while in the country. The result is that clear lines of distribution existing before the war have to a great extent broken down and the ordinary or secondary wholesale grocer is rapidly becoming a much less important factor in canned goods distribution. Some of the stronger institutions have of course improved their buying by seeking contact with the broker, but generally speaking the competition for the retailer's custom on the part of the dealers has *become so keen that there is not much left worth while for the wholesale grocer.*

Distribution, then, to-day seems to be either from

The Packer to The Retailer, with a small percentage going through the whole- sale grocer to the very small retailer.	*or*	The Packer to The Dealer and The Dealer to The Retailer.

Many people in the food business glibly prophesy the disappearance in five years of the dealers and assert the packer, both from abroad and at home, will take his place. This is, generally speaking, somewhat wild, careless talk, but there are unquestionably indications pointing to the gradual disappearance of the smaller dealer and speculative element who came into the business either during the war or during the hectic period immediately following. The increase of supplies and keenness of competition is limiting profits and it takes a good deal of money for dealers to develop an extensive retail trade. The smaller man cannot live and profits are not good enough to interest the speculative element, for more often than not they have burnt their fingers during the past few years. On the other hand, the large dealer, with his huge finance, his tremendous credit grip on the distributing trade of the country, due to the vast range of foodstuffs he handles other than fruits which the retailer and wholesaler must have, his years of experience in the trade, should, instead of becoming a declining force, *become a still stronger factor in the future for the fruit packer to consider in the distribution of his goods.* Packers abroad are, generally speaking, either exporting to this country apricots, peaches, and pears, or, as in the pine-apple cannery, the latter product. Surely no business man can see a packer opening up his own distribution here for this limited range and doing it as cheaply as he can through the dealer. The two successful American institutions, who have been established here some years, have a vast range of goods other than fruits to sell, or they could not exist. Consequently, the great majority of packers must continue to sell as heretofore through the dealers who give them service which cannot be replaced. At home, the wholesaler and retailer, too, could not afford to see the larger dealer decline, because the latter, keeping himself free from packing connections, is generally in a position to take advantage of the ups and downs of the market. Packers' ideas of prices, too, are not always the dealers' ideas, and as the packer abroad must continue to market through established marketing institutions here, it is to the advantage of the retailer if the dealer be a large powerful corporation. A good big dealer with vast distribution can always negotiate to better advantage in his interests than the small man. No! The large dealer should continue to grow stronger than ever, and this is very necessary, for with groupings of canneries taking place on the Pacific Coast and in Australia, and the general tendency for the combining of packing interests in all producing countries, we must have powerful organisations here to talk and negotiate with them. Moreover, the buyer generally does not care for straight fixed prices, and without the dealer such would be the case.

The leading manufacturers in this industry, which is of recent development, with one large exception, are mostly jam manufacturers. For the selling of their jams, jellies, etc., they established their own selling organisations, but since they have added canning fruits to their production they have found the canned goods distributing dealer of vast assistance to them in the marketing of the latter product. This is quite what one could expect, for with years of experience the retailer naturally has confidence in anything the latter has to offer. From a quality viewpoint, then, it pays the canner in his earlier operations to have the dealer's stamp of approval on his products. Whether once established he continues to sell in this manner is purely a question of finance. Packers packing canned fruits and canned vegetables only, however, should endeavour at all times to gain the support of the dealer unless fully prepared to launch out with a fully qualified selling force. It is questionable even then if he will place his products with as large a number of retailers as when selling mainly through the dealer.

Enquiries

56. We are manufacturers of glass bottle stoppers, but a demand has sprung up for cork stoppers with composition tops made from wax and other ingredients for which we are desirous of getting the recipe. Could you put us in touch with any literature from which we are likely to get the information?

* * *

57. We are in need of a yeast forming and cutting machine and should be pleased if you would hand over our enquiry to any firms making these machines. The following are fuller particulars of the machine required:

Drive.—Direct drive from motor mounted on machine.

Feed.—Two worms—one verticle and one horizontal.

Nozzle.—Approximately 2¾ inches square with rounded corners.

Cutter.—Arrangement so that pound pats can be cut off as the yeast is discharged from nozzle. We should prefer the cutter to be adjustable so that we could cut off any of the following sizes: 4 oz., 5 oz., 6 oz., 8 oz., 1 lb.

Capacity.—One to two thousand pounds per hour.

We know that machines similar to that specified above are manufactured in Germany, but should prefer to obtain from Great Britain if possible.

We should be pleased if you wodld ask the manufacturers to quote f. o. b.

For "Answers to Enquiries" see page 170.

The German Industry's Titanic Struggle

Mass Production—Economic Chaos—Reconstruction

By DR. O. LIPPELT,
(*Editor of the Brunswick "Konserven Zeitung."*)

"The pressure of war necessitated the utilisation of all means towards mass production." State management and subsidy, mushroom growth, inflation, paper profits, the return to sanity and the lean years. A German authority's description.

The illustrations to this article are taken from a book, "Der Gigant an der Ruhr," which is reviewed on page 169.

THE development of the German fruit and vegetable canning industries during the past decade has been most decisively influenced by the events of the Great War. Whilst these industries naturally concentrated on the production of high-quality goods before the war, the pressure of war necessitated the utilisation of all means towards mass production.

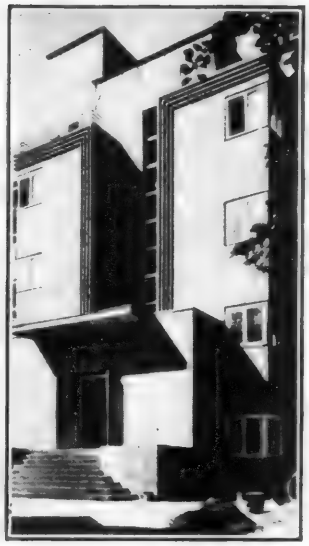
For the most part, this was accomplished under immediate Government surveillance and control. From the so-called *Zentralen* or depôts organised by the Government, factories received supplies of vegetables, beet, fruit, and sugar, and were forced to turn out products of a definite composition and in definite quantities, whereby, as I say, mass production became the order of the day. As money was no object, numerous plants of similar scope and all sorts of factories, new and old, took up canning, and were glad to get the same support as old, well-managed firms did. Mass! Quantity! These were essential. All efforts were to be directed to these ends.

The Inflation Period.

Such a state of affairs—with exclusive emphasis laid on mass production—could not, of course, have existed under ordinary circumstances. Then, after the war, a further complication arose through the inflation, when the impoverished majority of the German people were only too glad to get the most frugal of food, provided only that it was more or less palatable. It must be admitted, however, that the various bodies and federations in the Canning Industry, such as the *Wirtschafliche Vereinigung*, the *Verein der Konserven-Industriellen*, and the *Verein der Konserven-Fabrikanten* did their best, immediately the war was ended, to restore the pre-war quality of their products. But such efforts could not be expected to succeed under the appalling conditions that existed. Many a canner was befogged by the blessing of the paper-money régime, and thought he was making an enormous amount of money when in reality all he was achieving was a very large output. No wonder that new canneries sprang up everywhere like mushrooms, and that existing ones assumed dimensions enormously in excess of what was necessary or useful. The blessings bestowed by money never seemed to end.

Stabilisation Difficulties.

And then—with the return of the stabilised mark—came sobriety. It was clear by now to what an extent the manufacturers had become impoverished, and those who did not change their policy to suit the new conditions soon realised their mistake, to their sorrow. Many firms who had placed their nominal capital too high on the restoration of the goldmark had to reduce it in order to be able to make it earn a decent sort of interest. A fight for existence then began in which only the best-managed and well-established firms survived. Everything in the German canning business that was not absolutely sound suffered in the terribly difficult time that now came over the trade.



The Shortage of Capital.

Particularly difficult at this time was the problem of obtaining capital. Borrowed capital was, and still is, only to be had at extraordinarily high rates of interest, and as in the ordinary way the fruit and vegetable canning business hardly permits of more than one turnover of its money resources yearly, the industry has become, on the one hand, dependent on borrowed capital, only very few firms being able to maintain the necessary large stocks out of their own means, whilst, on the other hand, the attainment of a reasonable profit is hardly possible owing to the high terms of interest prevailing.

And that is the situation, as the yearly balance sheets of companies show. Not a few old, well-established, well-known firms are to-day merely earning the interest on money borrowed from the banks.

That, in short, is the position that the German canning industry has found itself in since the return of the goldmark. The situation is rendered somewhat worse by certain other features, such as the restrictions placed on the resumption of asparagus cultivation. During the war a large decrease in German asparagus production and an increase in the price of that commodity severely damaged one of the best-paying branches of the canning industry. Only now have farmers begun with the new scheme for asparagus planting, which, as is well known, requires several years' work before reaping the first harvest. Also, the unusually unfavourable weather of recent years, which looks like being repeated this year for the third time, is making a normal asparagus harvest seem as far off as ever. Finally, there is the growing competition from abroad (from America principally) against which there is no effective tariff protection or which manages to circumvent it.

The Remedy.

Of course, firms generally have fought these adverse conditions with all obstinacy—where they have not had to close down. It was seen that during the war foreign firms had obtained a good start over us in the matter of plant improvements, and energetic measures were taken, through the importation of the best machinery, the introduction of new methods of working, such as American "speeding-up"—in short, through rationalising—to make good this disadvantage. We have in great measure succeeded in this, although the advantage appears to rest more with the employés than with the employers.

Another great step forward was that of standardising the sizes of tin boxes and other containers. New food laws—from which, however, certain essential things seem to have been omitted—have created guarantees for the manufacture of good quality, incontestable (*einwandfreier*) products, thereby laying the foundations of further development.

The Objective.

The markets have recently shown an undoubted improvement, and it was just in the coldest months of a severe winter, when the transportation of practically all other foodstuffs was at a standstill, that tinned preserves were able to prove again how serviceable, under all circumstances, they are.

One is tempted to touch more nearly on such important things as the impact of the vitamin question on canning, questions affecting the cultivation and importing of raw material, pectins, advanced sales, etc., but the space at one's disposal is all too short. So I conclude with the observation that the German canning industry will maintain as its ideal and chief aim the supplying of the population with good, reasonably priced products.

At any rate, the industry will not want for keen leadership—technical or otherwise.

Lacquered Tinplate Is Supreme

By A. LL. MATTHISON.

In last issue we published the opinions of several authorities on the relative merits of stainless steel, aluminium and lacquered tinplate as substitutes for the ordinary tinplate used for containers. The following contribution to the discussion upholds the claims of lacquered tinplate as an ideal material in this class of work.

THE ARTICLES in the May issue of FOOD MANUFACTURE by Dr. E. W. Lewis and Mr. E. J. Norton, whilst being most interesting, are also very debatable. I propose, therefore, to deal with the question from the lacquer manufacturer's standpoint, and shall venture to offer my experiences and suggestions for the possible interest of the trades concerned—viz., the food packer and the manufacturer of tin containers.

The use of stoving lacquer for tin containers and closures has increased enormously in recent years, and is still increasing, not only in America, but particularly in England and in the continent of Europe. Very many foodstuffs formerly packed in plain tins are now packed in gold lacquered tins. Other foodstuffs which could not be packed in tin at all at one time are now packed successfully, thanks to lacquer.

It has been proved that a properly lacquered tin prevents contamination, corrosion, pinholing, and other faults, and preserves the life of the pack, besides giving the tin a much more pleasing appearance when opened.

Uses of Lacquer.

The advantages of inside lacquered containers for food are so considerable that sooner or later inside lacquering will be made compulsory, as indeed is the case in South America for imported fish in tins.

Without the use of lacquer it would be difficult, if not impossible, to pack many varieties of food at all, owing to the chemical action of food acids on the tin. The lacquer manufacturer has devoted years of research and experiment to the production of lacquers which will stand up to the very varied and drastic conditions now required in the process of canning, and has played a not unimportant part in the growth of the industry.

In addition to the severe tooling in making up tin containers and closures which lacquers have to stand without fracture, they must also resist not only the attacks of various food acids, but the drastic cooking and sterilising processes involved.

In spite of all these difficulties, I have no hesitation in claiming that a properly lacquered tin with a perfectly homogeneous film of lacquer will successfully resist the action of every known foodstuff.

The experiments at the Chipping Campden Research Station over a number of years on the Protective Action of Lacquer on Fruit Cans have been most valuable and instructive, and they confirm my own tests. The research department of the Food Manufacturers' Association has also done extremely valuable work on lacquers as a protective agency in meat packing, etc., which proves up to the hilt the necessity for lacquering the insides of food containers and closures.

The lacquer maker is continually being asked to produce new lacquers to meet the special requirements of a new pack or new methods of cooking, and is meeting these demands with continual success. The demand for tinned foodstuffs grows rapidly, and lacquer is a most essential element in successful packing.

Substitutes for Tin.

Stainless steel and aluminium have been mentioned as substitutes for tin. There are also glass and cardboard to be considered.

Stainless steel may be ignored at present owing to its cost; glass and cardboard are complementary to tin rather than competitive with it, and aluminium is chiefly used for closures. Certainly for closures aluminium is being largely used in America in place of tin, but these aluminium closures have to be lacquered. The cardboard container is said to be useful for milk and beer bottles, but even if successful could hardly affect the sale of tin receptacles.

I discussed the stainless steel container with Dr. Kohman at the Washington Research Laboratory last October, and I was privileged to inspect the results of his experiments. The matter, however, while extremely interesting in the laboratory, is not at present commercially interesting.

I have had no experience of aluminium-coated tin or steel, but lacquers are used on aluminium, whether container or closure, just the same as on tin.

Mr. E. J. Norton is quite wrong in assuming that "lacquers will answer with certain products only"—that is, if he means food products. After some considerable experience I confidently reiterate my statement, that *there is no known food product for which a suitable lacquer is not or cannot be provided.* A lacquer will protect the product from tin action and will withstand the chemical action of the particular foodstuff packed. There is, indeed, an enormous and diversified list of foods packed in lacquered tins, and their number is constantly increasing. So I can assure Mr. Norton with every confidence that he is in error.

Substitutes for Lacquer?

Admittedly, the stainless steel container, if it could be produced and if it could be guaranteed immune from any food acid attack, would be a perfect substitute for lacquer, but the possibility is too remote to be worth while dealing with in a practical and popular trade journal. There is, however, the use of nitro-cellulose, to which Dr. Lewis refers. Let us examine the possibilities of nitro-cellulose as a substitute for gold stoving lacquer.

I discussed this matter also with Dr. Kohman in

Washington, with Dr. Fitzgerald (head of the American Can Company's Research Association in Maywood), and with others, and I have naturally made full investigations and tests into the subject at home. The general consensus of opinion is that the use of nitro-cellulose lacquer is not practicable at the moment.

It is claimed that the cellulose film is not acted on by food acids, although the experiments have not been sufficiently extensive to dogmatise on this point. But there is the liability of the food itself becoming flavoured with the solvents used in the cellulose lacquer. I recently inspected some tins of fruit which had been coated with cellulose lacquer. When opened, the characteristic odour of cellulose lacquer was very obvious, and on tasting the fruit it was more obvious still, in short, extremely objectionable.

The main objections against cellulose, however, are on the grounds of cost and want of adaptability to mass production. Cellulose lacquer must be applied to the made up container by spray pistol. It cannot be rolled on the flat sheet by varnishing machine, and it cannot be tooled or drawn owing to its want of elasticity.

In order to insure the cellulose film's adherence to the tin, that tin should be chemically clean, otherwise "flaking" or "peeling" is liable.

There are also the great dangers of inflammability in its application, and of its toxic effect on the health of the operator. There are in existence very stringent Home Office regulations governing the use, application, and storage of cellulose lacquers, and fire insurance corporations also have a word to say as to premiums.

On the question of the prime cost of cellulose lacquer compared with stoving lacquer, not only is cellulose lacquer substantially dearer at the onset, but its covering power is considerably less, which increases its cost in use enormously.

It is necessary to mention these points, as several packers have been coquetting with the idea of cellulose lacquer, and a word of warning may save them much disappointment.

In conclusion, I claim that lacquered tin containers hold the field, and there does not appear to be any immediate prospect of their being supplanted. It must be remembered that food packing to-day is on mass production lines. Costs have to be very finely cut, and every advantage has to be taken of automatic methods right up from the reaping of crops to the final processes of labelling and boxing, in order to give the public wholesome and appetising foodstuffs at ridiculously low prices.

Until such time as science can evolve a mass produced container as cheap as, or cheaper than, lacquered tin, and at least as effective as a protective agency, it is perhaps advisable to sit tight. I therefore assert finally that tinplate, especially when lacquered, is supreme.

The following firms have just issued new price lists which are well worth perusing: Sulzer Bros., Bedford Square, W.C. 1, A. Boake Roberts and Company, Limited, Carpenter's Road, Stratford, E. 15, and W. J. Bush and Co., Ltd., of Hackney, E. 8.

Books Reviewed

pH Values in Food Chemistry

THE older school of food chemists expressed the acidity or sourness of foods such as vinegar or buttermilk in terms of the total amount of acid present, as determined by titration with standard alkali solution. Valuable though such information could be, unexplained anomalies arose, and the nature of the anion was over emphasised. The Arrhenius theory of solutions announced in 1887 has led to an entirely new viewpoint regarding acidity, a viewpoint which has had profound influence in bio-chemistry in general and in food chemistry in particular.

In 1920, Professor W. Mansfield Clark published his important work, a third edition of which has recently appeared.* This author points out that "acidity" has been resolved into two components: (*a*) The concentration of the hydrogen ions; (*b*) the quantity of acid capable of furnishing this ionised hydrogen. No ion has received so much attention by chemists as hydrogen ion in regard to methods of determining its concentration.

The actual intensity of "acidity" at any given moment in a solution is to be correlated with the concentration of *dissociated* acid—*i.e.*, with the concentration of hydrogen ions. Sørensen, in 1909, proposed a most convenient way of expressing hydrogen ion concentration, and his suggestion gained immediate and widespread acceptance. A solution normal with respect to hydrogen *ions* contains 1 gram of *ionised* hydrogen per litre and is expressed as N/1. Similarly, a tenth normal solution would be expressed as N/10. Sørensen proposed that the *logarithm* of the denominator expressing the normality of hydrogen ions be called the pH value of the system. Thus

$$pH = \log_{10} \frac{1}{(H^{\cdot})}$$

$$\text{or } (H^{\cdot}) = 10^{-pH}$$

For pure water, the hydrogen ion concentration is N/10,000,000, so that the pH value $= \log 0{\cdot}0000001 = 7$. This is the neutral reaction point, and the pH value of an acid system will be less than 7, of an alkaline system greater than 7.

That the new orientation of ideas on acidity will profoundly influence food chemistry is apparent if only by a study of proteins. These are amphoteric, and hence their behaviour is subject to the state of the acid-base equilibria of their solutions. Gelatin, for example, in aqueous solution, shows the striking relation of the pH value to such properties as surface tension, viscosity, jelly strength, solubility, degree of hydrolysis, etc; At pH 4·7 the hydrogen ion influence reaches a critical point (iso-electric point) where the dispersed particles are no longer electrically charged. Again, the question of milk acidity has led to numerous investigations of the complex acid-base equilibria involved. A practical instance of

* *The Determination of Hydrogen Ions*, by W. Mansfield Clark, M.A., Ph.D. London: Baillière, Tindall and Cox, 1928. Pp. xvi+717. 30s.

pH control is afforded by the acid precipitation of casein.

Water purification by sodium aluminiate or other coagulant has an optimum pH value for the most effective type of "floc," whilst pH control is essential in the flocculation of the waste disposed from packing houses, dairies, starch and sugar factories, etc. Similarly, the pH value is of great importance in the defecation and clarification of sugars.

The food chemist is now familiar with the intimate relation between pH value and jellying conditions in pectin and fruit jellies, jams, and marmalades. In the laboratories of modern bakeries the pH value of dough is now a routine test, and even biscuit baking has an optimum pH value.

On the bacteriological side there is much of interest. The heat sterilising of canned and bottled foods is closely related to the pH value, the more acid foods—*e.g.*, tomato, pH 4·2—being the more easily sterilised. The thermal destruction of vitamins, the action of enzymes, the fermenting of molasses to alcohol, the control of "diseases" of beer and wine, and the conditioning of the proteins present, all illustrate the remarkable influence of the pH value obtaining in the system studied. If further emphasis were needed, we need only remember how the older method of controlling the acidity of bacterial culture media has been replaced by the exact refinements of standardising to definite pH values.

The food chemist, therefore, is especially interested in Professor Clark's book. It is *the* standard work for reference. The new edition brings the subject right up to date, including several new chapters—*e.g.*, a discussion of the Debye-Huckel extension of the Arrhenius theory of dissociation. Although much new matter of a purely academic character has been included for advanced workers, it is on the *methods* for determining pH values that the food chemist will seek guidance. Excellent information is afforded of the simpler methods: colorimetric, hydrogen electrode, quinhydrone electrode. These methods suffice for general work, and the author's discussion of them is authoritative, clear, and extensive.

The whole book is a mine of information, excellently produced, and closes with a valuable bibliography. All food chemists should have this volume for constant reference in the laboratory.

WILLIAM CLAYTON.

* * *

Der Gigant an der Ruhr, M.P. Block. Albertus Verlag. Berlin, W. 15.

This, the seventh of the series "Das Gesicht der Städte," is a worthy piece of book production. The 304 half-tone reproductions reach a high level of excellence. Sixteen pages of letterpress introduce these scenes in the very heart of Germany's industrial might, where "auf dem ganzen Bild lastet etwas Düsteres und Schweres."

German canning is growing apace, and it is to the Ruhr that the industry looks for its equipment, containers, etc. Not without this idea in mind, Krupps are building a colossal new plant at Essen—yet another giant on the Ruhr.

Iodine in Nutrition. A Review of Existing Information. J. B. Orr and I. Leitch. Medical Research Council. H.M.S.O. 2s. 6d.

This report was originally undertaken with special reference to the expanding work of the Rowett Research Institute, Aberdeen. Workers in many different fields of animal and vegetable physiology, of medicine, and of agriculture, will be grateful for this compilation, drawn industriously from a great body of literature, ancient and modern, scattered among journals and books in various languages and of most diverse kinds. It is, indeed, much more than a useful compilation, for it gives the results of a critical historical survey of the subject up to the year 1928 made by actual workers in the experimental field of mineral metabolism. The report illustrates the wide range and variety of the sciences from which contributions to serve the purposes and needs of medicine—and no less those of agriculture—may have to be collected even under a heading apparently so restricted as that given by the single element iodine. It illustrates too the close community of scientific interest between medicine and agriculture which Dr. Orr himself has been so forward to recognise and to promote.

* * *

Chemisches Fachwörterbuch für Wissenschaft, Technik, Industrie und Handel. A. W. Mayer. Vol. 1, German-English-French. Leipzig, Verlag Spamer. 1929.

Translators of business, scientific, and technical texts should find this series of dictionaries of use, though the first completed volume aims beyond the limits of what is usually understood by the term "dictionary," since it introduces practical examples of chemico-technical phraseology customary for the various industries in the three principal languages.

Appropriate equivalents are given for professional terms and phrases used in manufacturing processes, special plant, etc., and the scientist and business man will both be at home with this good general book of reference.

Abstract of Paper read before the Society of Public Analysts on April 3, 1929

Furfural and Diastase in Heated Honey. By L. H. Lampitt, D.Sc., F.I.C., E. B. Hughes, M.Sc., F.I.C., and H. S. Rooke, M.Sc., A.I.C.

Modifications of Fiehe's test and the aniline acetate test for furfural have been devised, which give strong reactions with honey containing 5 per cent. of added invert sugar. If honey gives pronounced reactions with both of these tests it is probably adulterated, unless there is evidence that it has been strongly heated. Such honey has usually been found to be caramelised and unfit for use. Honey heated for twenty-four hours at 60° C. usually gives negative results in the furfural tests, both immediately and after storage for several months.

There is definite evidence that honey contains two diastatic enzymes, for it reacts with starch, yielding both dextrins and reducing sugars. If honey is heated above 85° C. its diastatic activity is very rapidly destroyed.

Answers to Enquiries

53. A machine that will peel onions, also oranges, lemons, potatoes, carrots, etc., is made by the Sprague Canning Machinery Company, Hoopeston, Ill., U.S.A. The cost is about £30. It works by power.

* * *

55. A good paint which will dry like glazed bricks is made in the following manner. One, or perhaps two, coats of this should remedy the trouble.

This paint will "seal the oil in the wood" as requested, as, being alkaline, it will saponify the resin in the pitch-pine.

Take 12 lbs. lithopone white, half gallon water, and 4 lbs. silicate of soda solution 40° Bé. Mix the white and water to a paste, add a dash of ultra blue (ground in water), if a white paint is required, then add the silicate solution and strain through a fine sieve.

If applying two coats, let the first dry thoroughly before applying the second.

If wanted other than white, add ordinary paint colours instead of the blue—colours ground in water and alkali proof, as used in distempers.

An ounce of anisic aldehyd (*aubépin*) should be procured from an essence firm, and if ten drops of this are diluted with thirty drops of methylated spirit and stirred into 1 lb. of the paint, after the first pungency has dissipated (may-blossom perfume) an appetising smell will take its place, reminding one of the odour of Nice or wafer biscuits.

National Food Canning Council Report

(*Continued from page* 156.)

more fruit, especially of strawberries, and the horticultural superintendents of the county councils have had their attention drawn by letters from the Council to the significance of the growth of the canning industry to fruit culture in their counties. Stimulation of fruit growing is regarded as an important part of the Council's work, and although it must be brought about mainly through business arrangements between canners and growers, the Council has much to do to increase faith in the future of canning, so that growers may be led to plant now what will without doubt be wanted in years to come.

Besides questions of fruit production, the future of the Research Station at Campden has been the subject of conferences with Government officials the results of which are not yet known. That the Campden Station has been, and can be, of very great assistance to the still developing canning industry of this country is recognised by the Ministry of Agriculture, and it is hoped that the views of this Council as to its future will prevail and this station be preserved under its present régime for the use of the industry. That some such organisation as Campden is essential is proved by the evidence of widespread interest in the commercial possibilities of canning. In 1928 over 200 inquiries were dealt with by Campden and the Council, and of these many were from individuals who may be expected sooner or later to commerce canning operations. Some have announced their intention to do so, and among them are firms of large resources already concerned with food manufacture. It is obvious, therefore, that there is consideration going on all over the country of a kind likely to result in an extension of the canning industry on a scale proportionate to the population of this country.

As regards canned fish, the various sub-committees have merged themselves into one Fish Committee, and the meetings held have been in the nature of general surveys. Active co-operation has been given by the Ministry of Agriculture and Fisheries and the Scottish Board of Fisheries, whose representatives have attended. These Government departments have been engaged in compiling reports on questions relating to the need for larger supplies of sprats for the canneries, and it is hoped that from them practical measures may be evolved which will lead to increased production of canned brisling. Canned fish has been included in the publicity activities of the Council, and there have resulted a number of inquiries as to the possibilities of starting new factories, principally on the west coast.

It is satisfactory to be able to report that the can supply has generally been adequate, and that the quality of the cans has improved considerably.

During the year which has elapsed since the Convention in Worcester, several meetings of the various committees have been held.

In December the Council's third annual luncheon was held at the Hotel Cecil, and was a very successful function. The Minister of Agriculture and Fisheries, the Rt. Hon. Walter Guinness, addressed the gathering, which was representative of all the interests connected with canning. Since that function he has emphasised the activities of the Council on several occasions in the House of Commons and in speeches outside.

The Second Annual Convention at Worcester in May, 1928, was attended in considerably greater numbers than the First Convention, and secured a large volume of publicity in the Press. A small Canners' Exhibition was held at the same time, which, for its size, was considered by exhibitors to have been successful.

There are two matters which will demand the Council's attention during the coming year, apart from its main preoccupation with propaganda.

First, the position of the Campden Research Station is not established yet, and it is clear that the Council will have to use all the influence it can command to insure that the industry has this source of help retained for it for years to come. This season the station will have fresh work to do in that the Council has been able to obtain for its use a machine for packing fruits and vegetables by the vacuum process, for which much is claimed. On the results may depend improvements of great value to the canning industry, and those results should be available for all present and future canners.

Secondly, at the request of the Ministry of Agriculture the Council will have to decide whether canned fruits shall be brought under the Agricultural Produce (Grading and Marking) Act, with a system of grading and possible use of the National Mark. This is an important question for the industry, and one on which many conflicting views may be held. Consequently, very careful examination will be necessary.

Canned Vegetable Troubles Arising from Sugar

By W. HAMILTON GORDON.

MR. E. J. CAMERON, of the Research Laboratory of the National Canners' Association in the United States, has just stated that in the canning of non-acid vegetables, spoilage following under-sterilisation is usually manifest by the activity of thermophilic, or heat-loving bacteria. These organisms prefer temperatures for growth in the neighbourhood of 130° F., and some of them are incapable of development at blood temperature—*i.e.*, 98·6° F. There are three groups in this spoilage category, the most important of which is the flat sour group, which produces acid without gas. Then there are two groups of thermophilic anaerobes which require absence of free oxygen before growth will occur. One of these produces acid and gas and gives rise to what are called thermophilic swells. The other produces hydrogen sulphide, and this results in sulphide spoilage. Spores of all these classes of thermophilic bacteria represent the most resistant kinds known, and, of course, this is a predominant factor in establishing their importance in the canning industry.

Until a year or two ago reliance was placed on processes thought to be protective against these thermophiles. Though generally successful, there were occasional cases where spoilage resulted in spite of their use. Very little was known as to the sources of these bacteria or regarding the circumstances that would lead to their excessive development. Most investigators held the rather logical belief that they originated in soil, and that the method of handling the raw product had a traceable connection with thermophilic spoilage. Others, in attempting to account for the high resistance of these thermophilic spores, conceived of the selective effect of heating. It is assumed that this refers to a hypothetical chain of circumstances under which one processing would serve to select the most resistant of the spores entering the can. Then these bacteria would grow and in some manner their progeny would become redistributed through the canning operation and this cycle would follow again and again, culminating in a wonderfully resistant race of spores. Mr. Cameron considers that these and related conceptions strained the limits of existing knowledge. Indeed, early experimental work in the National Canners' Association Laboratory showed that where highly resistant spores are concerned, possibilities of increase in heat resistance through heat selection are not great.

He says that the facts as known to-day are as follows: Spoilage thermophiles are extremely rare on the raw product to be harvested—too rare to be isolated by direct cultural methods. Indirectly we know they must be there in small numbers. By keeping peas or corn before canning, and under a variety of conditions as regards temperature and moisture, the laboratory has been unable to promote development of spoilage thermophiles. It has been established that when thermophilic spoilage occurs, it is usually the result of some adverse condition within the factory which has led to excessive growth. To account for the initial seeding or inoculation at the factory, there appears no question but that the raw product is responsible to some degree, but this source is entirely secondary and far less serious compared with that provided through the medium of sugar.

In 1926 the Association's Laboratory demonstrated that flat sour bacteria may be found in sugar. Since that time, as a result of a survey, it has also been found that the thermophilic anaerobes and sulphide spoilage bacteria may be carried likewise. In this survey spores of flat sour thermophiles were found in essentially all the cane sugar samples examined. Thermophilic anaerobes were encountered periodically. Sulphide spoilage bacteria were found least frequently. Flat sour spores were not often found in white beet sugar, but some samples appeared to contain spores of thermophilic anaerobes in greater numbers than were found in cane sugar. Also sulphide spoilage bacteria were found on rare occasions in beet sugar.

A study was made of one sugar-refining operation which led to results indicating that the thermophiles entered with the raw sugar. The investigation has been carried no farther than this. The highest degree of infection was noted in the vacuum pans where the sugar syrup is evaporated.

Some sugar refiners are considering these developments with a view to the elimination of these bacteria from these products. Favourable results have been reported by one. The Laboratory has not, as yet, any standards in the matter. How high a degree of spoilage contamination is necessary in order that the sugar should become unfit for use in canning cannot be stated at this time. Some sugar examined is decidedly unfit for canning non-acid vegetables. It is hoped that a clean product will be available shortly, and then absolute freedom from spoilage types will constitute its standard.

The principal findings of the Association's Laboratory regarding sugar have been confirmed by Mr. L. H. James, working at the Bureau of Chemistry. His study was extended in scope to include quantitative estimations of numbers of various groups of bacteria, some of which bear no direct relation to canning problems. It is of specific interest, however, that he was able to isolate putrefactive anaerobes from sugar of all types examined and from a large percentage of samples.

It may be that the microbial condition of sugar is of minor significance in the canning of meat. It is apparently not used in any way with the majority of meat products. But where sugar is used in curing mixes in preparing meats for canning, it would be strange if the facts stated above were without significance—particularly as regards the fact that sugar may carry putrefactive anaerobes. It is of interest here to note that it has been possible to isolate flat sour organisms from one case of meat spoilage. Other bacteria were isolated also and the spoilage was undefinably composite, so it is impossible to say just what part was played by the flat sour types.

Salmon Recipes

The following are taken from a book issued by the Associated Salmon Packers, Seattle, U.S.A., containing the best of several thousand recipes received in a nation-wide contest in which prizes were offered.

Salmon Patties.

1 lb. can salmon.
2 tablespoons heavy cream.
½ teaspoon salt.
Few grains pepper.
1 cup sifted bread crumbs.
2 cups white sauce.
4 eggs.
½ cup celery cubes.
8 slices toast.
4 tablespoons cold water.

Flake the salmon, add two eggs slightly beaten, cream, salt, and pepper. Mix and shape in small flat cakes. Beat the other two eggs slightly and add the cold water to them. Mix well. Roll the salmon cakes in bread crumbs, dip in egg, roll in crumbs, and sauté in butter until well browned on both sides.

Cook the celery cubes until tender. Add to the well-seasoned white sauce.

Serve each salmon cake on a slice of toast, cover with the white sauce, and serve at once. This serves eight.

Salmon Hollandaise.

1 lb. can salmon.
¾ cup butter.
Yolks 4 eggs.
Juice 1 lemon.
½ teaspoon salt.
Few grains paprika.
¾ cup boiling water.
1 cup peas.

Flake the salmon. Cream the butter; add egg yolks one at a time. Beat each one thoroughly into the butter before the next is added. Slowly add the lemon juice, salt, paprika, and the boiling water. Beat thoroughly. Add the flaked salmon. Cook over hot water until thick, stirring constantly. Serve in patty shells. Serves six.

Baked Salmon in Potato Shells

8 smooth medium-sized potatoes.
½ cup milk.
1 lb. can salmon.
1 egg.
1 onion chopped.
Seasoning to taste.
Lemon juice.
8 slices ripe tomatoes, or
8 slices pimiento.
1 cup bread crumbs.
2 tablespoons butter.
Catsup.

Flake the salmon, add lemon juice to it, and let it stand while the other ingredients are being prepared.

Bake the potatoes. Remove a slice from the top of each, and scoop out the contents. Mash thoroughly, adding the milk, egg, onion, and seasoning.

Salmon Omelette.

1 eight-ounce can salmon.
1 tablespoon chopped onion.
1 tablespoon chopped green pepper.
2 tablespoons bacon fat.
1½ cups canned tomatoes.
½ teaspoon salt.
⅛ teaspoon paprika.
1 tablespoon flour.
½ cup milk.
4 eggs.
2 teaspoons butter.
⅛ teaspoon pepper.

Cook the chopped onion and green pepper in the bacon fat until delicately brown. Flake the salmon. Add the tomatoes, salt, pepper, paprika, and salmon to the browned onion and pepper. Simmer ten minutes. Mix the flour with the cold milk, add to the hot salmon mixture, stirring thoroughly. Cook one minute and remove from fire.

Separate the eggs and beat the yolks until thickened somewhat. Beat the whites until stiff.

Add the salmon mixture to the beaten egg yolks, stirring constantly during the process.

Put the butter into a hot frying-pan. Pour the salmon and egg yolk mixture into the pan. Cook slowly until the mixture begins to stiffen. Spread the stiffly beaten egg whites over this. Fold and bake in a moderately hot oven about ten minutes. Serve at once on a hot platter. Serves four to six.

Devilled Salmon.

1½ lbs. canned salmon.
3 tablespoons butter.
2 tablespoons chopped onion.
2 tablespoons chopped green pepper.
1 teaspoon lemon juice.
1 cup condensed tomato soup, or
1 cup highly seasoned tomato sauce.
½ teaspoon salt.
3 or 4 drops tabasco sauce.
¼ teaspoon paprika.
6 slices hot buttered toast.

Flake the salmon, add the lemon juice to it. Cook the finely chopped onion and pepper with the seasonings in the butter about five minutes. Add the cup of soup or tomato sauce and cook two minutes longer. Add the salmon and cook about five minutes, stirring constantly. Serve on hot, buttered toast. This serves six.

North American Prosperity.

THE ESTIMATE of new wealth to come to Canada in 1928 is $130,928,000 as compared with $165,928,000 the year before. While, however, in 1927, $146,331,000 was accountable to the United States and only $11,000,000 to Great Britain, in 1928 Great Britain invested $30,000,000 as against $98,000,000 by the United States. In other words, in the past year British investment was more than double that of 1927, while the net new United States investment was one-third less.

The total capital invested in Canada is as follows:

	1918.		1928.	
Great Britain	$1,860,000,000	77%	$2,234,364,000	39%
United States	417,143,220	17%	3,313,512,000	57%
Other Countries	139,589,650	6%	248,793,000	4%
	$2,416,732,870		$5,796,669,000	

The Growth of Halifax, N.S.

For many years millions of tons of freight have gone through U.S.A. ports which might have been shipped via ports in the Maritime Provinces of Canada, a diversion of traffic which is estimated to cost Canada some eight millions sterling annually. To-day, however, Halifax is rapidly growing, recording an increase of about one million tons of shipping calling at this fine harbour last year, and the White Star and Cunard lines have put on regular services from Halifax to Britain.

Canadian Trading Facilities.

Everything favours the British manufacturer desirous of entering the Canadian market, no matter whether he decides upon shipment of goods from his works in England or the establishment of a branch factory in the Dominion. The Canadian Government assists the manufacturer and exporter in every possible way, not only by providing departmental information which is indispensable, especially in the case of branch factory operations, but also by the preferential tariff which enables Empire traders to operate in Canada with distinct advantages over foreign competitors.

The Canadian banks, too, go out of their way to encourage and facilitate trade development and have much valuable information available for British firms investigating the possibilities of marketing their goods in the Dominion.

Survey of American Canning.

According to figures collected by the United States Department of Commerce at the biennial census of manufactures taken in 1928, the total value of canned and processed fruits and vegetables and of pickles, jellies, preserves, and sauces produced by commercial establishments in the United States in 1927 amounted to $552,894,510, a decrease of 8·9 per cent. as compared with the corresponding value of $606,939,718 for 1925.

The total production in 1927 was made up as follows: Canned vegetables and soups, 97,355,699 cases, valued at $234,259,659; canned fruits, 27,564,341 cases, $101,730,609; dried fruits, 1,012,795,660 pounds, $64,167,036; dried and dehydrated vegetables, 200,180 pounds, $80,584; pickles, sauces, etc., $114,974,229; preserves, jellies, and jams, $37,682,393.

Of the value of the total production for 1927, as given above, $539,418,694 was contributed by establishments in the "Canning and Preserving" Industry, as classified for census purposes, and $13,475,816 by establishments in other industries which produced these commodities as secondary products. The establishments in the canning and preserving industry are engaged primarily in canning and preserving fruits and vegetables and in manufacturing pickles, jellies, preserves, and sauces.

The statistics for 1927 and 1925 for the industry proper are presented in the following table:

	1927.	1925.	*Percentage Increase (+) or Decrease (−)*
Number of establishments	2,436	2,403	+1·4
Wage-earners (average number)	80,562	85,866	−6·2
Wages	$62,309,660	$67,427,244	−7·6
Cost of materials, factory supplies, containers for products, fuel, and purchased power, total ...	$355,185,602	$385,573,475	−7·6
Materials, supplies, and containers	$350,111,529	Not reported separately.	— —
Fuel and power ...	$5,074,073		
Products, total value	$572,345,862	$616,070,748	−7·1
Canned and preserved products	$539,418,694	$594,875,914	−9·4
Other products ...	$32,927,168	$21,194,834	+55·8
Value added by manufacture	$217,160,260	$230,497,273	−5·8
Horse-power	189,831	187,490	+1·2

Success of Lyons Fair.

It was feared at one time that the success of the International Spring Fair at Lyons might be affected by the cold weather, but such doubts were not justified by events, for the exhibition was highly successful. The number of those showing was only limited by considerations of space, and actually 3,427 firms belonging to twenty-five different countries participated in the Fair, and for the first time the number of German exhibitors exceeded those from the United States.

Foreign buyers were particularly interested in foodstuffs, in various types of machinery, in textiles, in perfumery, in motor-cars, in furniture, hosiery, and in ceramics.

About a third of the space for 1930 was booked up before the end of this year's Fair.

Some Wet Statistics

Dr. C. Norris, Chief Medical Examiner of New York, has issued a report on *Alcohol Deaths in New York*, which shows an astounding and continuous increase in the loss of life from alcoholism under so-called Prohibition. This is the record:

1919	176
1920	98
1921	119
1922	274
1923	429
1924	513
1925	682
1926	759
1927	1,309
1928	1,565

Dr. Norris states that "page after page of the City files records homicides, motor accidents, and accidental deaths from falls. Most of these were directly traceable to bad liquor. There is just as much drinking to-day as there was when the saloons were running full blast.

—about a Dry Country.

Mr. R. D. Blumenfeld's evidence on this point is worth repeating, and bears the imprint of impartiality since he is himself American born and to-day holds the responsible position of Editor of the *Daily Express*. He describes the scene in one of the large Chicago hotels in which he was staying following upon a big football match. The evening was spent in dancing, "by midnight the place was Bedlam," everything movable was thrown about, "the fury was maintained through a sleepless night. In the morning the place looked like a battlefield." A doctor who was then in attendance was asked how it all happened.

Synthetic Gin.

"Gin," he said, "synthetic gin. It drives them temporarily mad. Prohibition, you know. If it wasn't prohibited they wouldn't want it. The most pathetic feature of it is that so many young girls are affected and have begun to think that it is the right thing to drink."

President Hoover, in his inaugural address, drew attention to the "malign danger of disregard for and disobedience of the law," and, in referring to the "undoubted abuses which have grown up under the 18th Amendment," he remarked: "A large responsibility rests directly on our citizens. There would be but little traffic in illegal liquor if only criminals patronised it. We must awake to the fact that this patronage by large numbers of law-abiding citizens is supplying the rewards and stimulating crime."

So there it is. *Plus ça change, plus c'est la même chose.*

More than 0·3 per cent. Pectin *Verboten.*

A commission composed of representatives of the industries involved together with the Association of German Food Chemists has recently decided that the addition of 0·3 per cent. pectin, calculated as calcium pectate, to fruit jams and marmalades and 0·6 per cent. to fruit jellies be proposed as standard without the necessity of declaring the use of pectin on the label (says the *Zeitung der Untersuchung Lebensm.*). The use of glucose in amounts up to 25 per cent. in jams, jellies, and marmalades, with label declarations is permitted. Added colour must be declared, but not small quantities of added acids.

Cocoa Butter Substitutes.

New German regulations permit the use of substitutes for cocoa butter in certain confections without declaring their presence on the label of the material. Up to the present this is true only for "Ice-Cream Chocolate" and for certain liquid filled bonbons covered with chocolate. The substitutes must be of vegetable origin, and are usually coconut oil and sometimes peanut oil.

It has been found by an English firm that a good "bitter" chocolate can be made without any cocoa butter or substitute by the addition of an adequate quantity of soya flour.

Drying Fruit Juices in Budapest.

Successful experiments have been made at Budapest in drying fruit juices in the same way as milk is dried. The juices (grape, apple) contain approximately 77 per cent. water, 20 per cent. sugar, and 0·4 per cent. protein. The fine powder obtained by the spray process and dried at 13° to 40° C., readily dissolves in water and then possesses all the properties of the fresh juice, with its aroma, taste, physiological action, vitamin content, and ability to ferment. The dried product will keep indefinitely.

The Pilchard Oil Industry.

That rapid strides are being made in the development of the pilchard oil and meal industry in British Columbia is shown by the figures of the 1928 production, given by the Vancouver Merchants' Exchange in its annual report.

This youthful offshoot of the fishing industry has now completed its third year of active operation. The number of plants operating has increased from 15 in 1926 to 23 in 1928, and the output of pilchard oil last year at 3,977,656 gallons, compares with the Government's figures of 2,673,876 gallons in 1927 and 1,898,721 gallons in 1926.—*Canada.*

Sugar from Wood.

After the foundation in July, 1928, of a company in Heidelberg, with a capital of 200,000 marks, to export German production of wood saccharification, it is now proposed to erect a plant in Stettin with a probable capacity of 600 to 700 tons daily. The process in use involves the production of fodder sugar from wood waste by treatment with concentrated hydrochloric acid primarily. Sugar from wood waste resembles ordinary sugar, but does not possess its sweetness nor the fermentation qualities. It is represented as being a cheap article suitable for mixture with animal fodder to replace corn and other carbohydrate foods. After the erection of this unit in Stettin, it is planned to establish other plants in Germany. It is reported that a firm in Edinburgh has formed a new concern to exploit this process.

Dried Milk in Germany.

Both "dried milk" and "milk powder" are the evaporated product of fresh cow's milk, containing from 1 to 6 per cent. moisture, says *Der Zuckerbäcker*. The milk powder is obtained by spray drying, whereas the dried milk is dried on a rotating cylinder. The older process involved the use of such chemicals as sodium carbonate, calcium saccharate, etc., to mix with the milk before drying in thin sheets on a hot rotating drum, which may or may not have been enclosed in a vacuum. The spray drying is accomplished after evaporation to a water content of 50 per cent., and does not involve separation of the butter fat. Milk powder retains its pleasant fresh taste for four to five months, but after six months rancidity begins to set in.

"Block" Milk.

A new milk product has recently appeared in Germany which is intended for use in chocolates and caramel bonbons. It is an evaporated milk of low moisture content compressed into a solid block and covered with a thin layer of cocoa butter which acts as a preservative, and which consists of about 1 per cent. of the total mass. The milk is prepared in similar fashion to the fluid evaporated milks, using 10 per cent. sugar before evaporation, but more water is removed from the product. Chemically, it is a compressed grey-white powder, containing 15 per cent. fat, and 11 per cent. moisture. As it is treated in similar fashion to the powdered milks which are familiar, it contains about 40 per cent. sugar. An important difference is to be noticed in the lessened exposure to the air of the block milk, which prevents the changes in chemical composition due to oxidation by the air, and retains the original flavour. It is cheaper than powdered milk due to the large sugar content. It is much more stable than condensed or evaporated milk due to its lower moisture content. The product is especially recognised in the German tariff regulations as "Fat-coated Block Milk."

Aus Wien.

"So they have found that swindler the police have been wanting."

"Yes, he went to an hotel and said he was an American; he sat down and didn't drink alcohol, so the manager got suspicious."—*Faun, Vienna.*

Openings for British Trade

British firms may obtain the names and addresses of the persons or firms referred to in the following notices by applying to the Department of Overseas Trade, personally or by letter (Development and Intelligence), 35, Old Queen Street, London, S.W. 1.

Applications for names and addresses must be sent to the Department of Overseas Trade, except where otherwise stated.

Proposed Cold Store at Tallinn (Reval).—H.M. Consul at Tallinn reports that the Estonian Ministry of Agriculture are arranging an international competition for designs in connection with the erection and fitting out of a proposed cold store. Plans should be presented in Estonia by July 1, 1929. (Ref. A.X. 7825.)

Colonial Products, especially Tea, Coffee, and Cocoa.—A well-established agent in Madrid wishes to represent British exporters of the above commodities. (Ref. No. 358.)

Cattle Food.—A well-established firm of importers and agents in Gothenburg desire to obtain the representation of British exporters of the above. (Ref. No. 359.)

Custard Powders, Jams, etc.—A Rotterdam commission agent, well introduced among wholesale dealers and the more important retail dealers in groceries and other articles, desires to secure the representation of British manufacturers of the above. Correspondence in English. (Ref. No. 328.)

Biscuits.—An agent in Las Palmas with good business connections wishes to secure agencies for British manufacturers of the above classes of goods. (Ref. No. 337.)

Tea.—A well-known firm in Buda-Pest desires to secure the representation of British exporters of the above. (Ref. No. 356.)

Fruit and Grocery Lines.—A broker in Saint John, New Brunswick, who already represents in New Brunswick Canadian and British firms for the sale of jam, starch, ammonia powder, canned goods, fruit, lobsters, nuts, cream of tartar, etc., desires to represent other British firms for fruit and grocery lines on a commission basis. (Ref. No. 319.)

Cattle-Feeding Cakes and Agricultural Machinery.—A well-known Dutch firm, which has a large sales organisation and warehouses, and can, if necessary, carry stocks, desire to secure the representation, on a commission basis, of British manufacturers of the above. (Ref. No. 373.)

Biscuits, Provisions, etc., Dyestuffs.—A Dutch firm employing travellers desire to secure the sole representation for Holland, on a commission basis, of British manufacturers of the above. (Ref. No. 374.)

Agent's Services Offered.—A commission agent in Rio de Janeiro desires to get into touch with British exporters of codfish. (Ref. No. 416.)

Coffee.—An agent in Bremen desires to secure the representation, on a commission basis, of British coffee exporters. (Ref. No. 405.)

Soda Water.—An agent in Las Palmas, who has been well recommended, wishes to get into touch with a British firm manufacturing soda water with a view to undertaking their representation in the Canary Islands. (Ref. No. 412.)

Trade News

THE AMERICAN INVASION

THE FACT that considerable publicity has been given to the proposed establishment in this country of an extensive American can-making concern cannot have escaped the attention of an important section of our readers. Viewed broadly, the British fruit, vegetable, fish, and meat canners are not, primarily, concerned with the source of the containers they use in their factories, and their interest in the rumours to which we refer are centred solely around questions of price and quality. Like all other classes of industrial traders, canners seek the cheapest market and the best that can be got for their money; but they also exhibit a decided preference for commodities manufactured in their own country, *provided these commodities meet the exigencies of commercial competition.*

First-Class American Products

We have no hesitation in saying that, up to within quite recent times, the British tin container did not compare favourably with that produced in America and Canada. In the first-named of these countries, a vast industry in canned foodstuffs has been established; and Canada is also rapidly assuming an assured position in this respect. The result is, that given the demand American tin-box makers have concentrated upon the production of a first-rate article. They considered the tin container as a problem in engineering, and they not only perfected the machinery used in the mass production of tinplate articles, but they also fashioned these cans and containers in a manner which displayed highly finished workmanship and a profound knowledge of what the tin can has to stand up to, in the matter of stress and strain caused by the unstable nature of its contents and the treatment it receives in the course of transport and handling.

The lessons taught us by skilled American engineers have, however, sunk deeply in the minds of British tin-box makers. To-day, it is obvious that many of our best houses are fully equipped with plant and operatives capable of matching the great qualities associated with American production. On the other hand, there does remain a substratum of British makers whose production does not compare well with their competitors overseas, despite the fact that they have all had equal advantage of the outspoken criticism to which the British tin can was subjected by a voluble, but extremely convincing and capable, American expert who favoured us with a visit some time ago.

A Business Ruse?

As to the American project of an invasion of these shores eventually materialising, we can only say that we have authority for assuming this to be no idle threat. In any event, all the best machinery, designed for the rapid and accurate mass production of tin containers, emanates from the States. This being undoubtedly the case, it has been suggested that the idea of ousting British tin-box makers in their own country is, to some extent, a ruse to induce them to install the latest types of American machines. In the interests of an industry which is rapidly assuming enormous proportions, we should welcome the success of any method of doing business which tends to introduce the wished-for improvement in quality and the imperative reduction in price for an article one can only describe as the prime necessity of the canning industry.

Tin-Box Makers Refuse Rationalisation.

The basic raw material of a tin container is, of course, tinplate, and the import of this raw material from the States, which would, no doubt, follow upon the erection of tin-box factories controlled by American finance, might be viewed with some concern by the Welsh tinplate makers, whose home trade now exceeds one-third of their total production. This, however, is a "domestic" problem and hardly interests the canners. It is a matter which might be discussed between the tinplate makers and their customers but it happens that tin-box makers, as a trade, show scant signs of mutual help, or of real co-operation among themselves. Had it been otherwise, we feel there would never have been any American invasion, or threat of direct competition in our home market.

* * *

New Depôt for Danish Bacon.

His Excellency Count Preben Ahlefeldt-Laurvig, the Danish Minister to the Court of St. James's, has just opened a new depôt at East Smithfield of the London and North Eastern Railway Company, for the reception, storage, and distribution of Danish bacon brought to England via Esbjerg and Harwich. The site is opposite the main entrance to the London Docks, close to the Tower Bridge and Tooley Street, and convenient for serving South London and the Central Meat Market in West Smithfield.

* * *

All floors are finished in concrete, with water hydrant and drainage, both for flushing for cleanliness and to maintain the low temperature required for bacon. The roof is designed especially to exclude the sun's heat, and the roof windows are of clerestory formation, with overhanging eaves. Three railway lines can enter the building. As the bales come in on the railway trucks, they are seized by "rapid-action" electric overhead travelling cranes, which hoist them to the story desired. Each floor is pierced by "wells," allowing the bales to be passed up or down as required, either for storing, sorting, or delivering. Each bale of bacon weighing over two hundredweight can be lifted by two men, and wheeled on a truck by one man, and a whole train of twenty-six waggons can be unloaded in an incredibly short time.

The North-East Coast Exhibition. Palace of Engineering.

The North-East Coast Exhibition is in full swing, and business, we hear, has been brisk.

What the "North-East" does, it always does with a will. Circumstances—frequently grim—have from the earliest times demanded from its people exceptional vigour and resource. With the rise of Industrialism, they marched into the very forefront, and the same North-East which saw the birth of Stephenson's "Rocket" is to-day the nation's workshop.

Though the district has fallen on bad times lately, the inauguration of this great Industrial Exhibition is doing much to revive its trade.

* * *

The management of the International Bakers' and Confectioners' Exhibition and Market to be held this year at the Royal Agricultural Hall, London, from September 7 to 13, informs us that they are at present in communication with all foreign Consuls General and Agents General for the Colonies regarding the attendance of members of the trade in their respective countries at the Exhibition. Announcements of the Exhibition are now appearing in a large number of journals overseas. We are asked to invite the trade, both wholesale and retail, of this or any other country, should they have any suggestion by which the Exhibition can be made of more value, educationally or internationally, to the trades concerned, to communicate with Mr. Rogers, 11, Queen Victoria Street, London, E.C. 4.

* * *

An interesting article for use in the laboratory has just been put on the market. It is a vessel for measuring liquids by weight, of distinct advantage when compared with the old method of volumetric measurement based on tables of conversion. The vessel is jug-shaped and widens with each graduation upward. The lip of each graduation is rounded, and thus neutralises the natural curve of the liquid's surface, which becomes quite level, the measurement being therefore true. The makers are C. Herendeen and Company, Limited, of Liverpool. For further particulars see our advertisement pages.

* * *

Reports from the fourteen companies constituting the Beet Sugar Factories Committee, which operate eighteen factories in this country, show that contracter acreage of land is over 15 per cent. in excess of last year's sowings, and is increasing daily. The past season was a favourable one for the grower, who, receiving a fixed guaranteed price for his beets, has not been affected by the fall in prices. The amount distributed among sugar beet growers last year was about £3,500,000.

The 32nd Universal Cookery and Food Exhibition will be held from January 14th to 25th, 1930, in the New Hall, Olympia, London, W. The first innovation will be an extension of the Exhibition period from eight to eleven days, and another is an arrangement by which both space and exhibition stand may be obtained at an inclusive rental, thus obviating that excessive expenditure of time exhibitors have hitherto devoted to stand construction, also minimising the cost. Some five different types of stands, of various designs, will provide exhibitors with ample opportunity of display, whatever their special exhibit may be, and while there will be a variety of type, everything has been so designed that an artistic and constructional harmony will be achieved.

* * *

Among the competitions that are being organised are those of the Culinary Group, divided into several classes, the competitors being the chefs of the leading hotels, clubs, and restaurants throughout the country; the Domestic Section, including Junior, Red Cross, Scouts and Guides, household and Artisan cookery, and invalid cookery, whilst special competitions are being arranged for the United Services, the Army, Navy, and Air Force. A great contest is promised in connection with the practical demonstrations of cookery for the Army and Navy Challenge Shields.

The new prospectus and plans relating to the Exhibition are now available from Drury House, Russell Street, Drury Lane, W.C. 2, and information in connection with competitions and demonstrations, etc., is obtainable from the Association's Offices, at 108, Victoria Street, S.W. 1.

* * *

The Fifth Annual Convention of the Advertisers' Association is to be at Newcastle-upon-Tyne from June 15 to 19. The theme of this Convention is to be "The Quest of Markets." Year by year the ties between Advertising and Industry are strengthened, and closer co-operation has led to greater respect and confidence.

With one of the largest exhibitions ever planned as its background, this Convention affords a further opportunity for Advertising and Industry to meet on common ground.

* * *

It is reported from Hull that the Trawler Owners' National Organisation intend to conduct a campaign to "Eat More Fish," similar to that started in the city a few years ago to "Eat More Fruit," and later taken up by the Fruit Trades Association. It is understood that approximately £50,000 have been allotted for this purpose. Payment of this sum is to be collected from members of the central organisation by the establishment of an assessment on each pound of fish landed by trawlers.

* * *

At the annual meeting of the Cornish Federation of Master Bakers and Confectioners, held at Truro on May 30, a resolution from Camborne urging the National Association to use the advertisement columns of the Press for the purpose of emphasising the value of bread as a food was unanimously agreed to.

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

New Companies

JES. GUNDERSEN AND COMPANY, LIMITED. (237733) Regd. March 7, 1929. To carry on the bus. of mnfrs. of and dlrs. in food and meat and live and dead stock, cattle rearers, etc. Nom. Cap.: £1,000.

BRANDS WAVERLEY TEMPERANCE HOTEL, LIMITED. (237766) Regd. March 8, 1929. To carry on the bus. of temperance hotel proprs., etc., at Brands Waverley Temperance Hotel, 122, High Street, Stockton-on-Tees. Nom. Cap.: £5,000.

WALTER AND LYNN, LIMITED. (237780) Regd. March 8, 1929. To take over the bus. of a wholesale grocer and provision dlr. cd. on at Old Farm Place, Jubilee Street, Brighton, as "Walter and Lynn." Nom. Cap.: £20,000.

CAMBRUNNEN WATER COMPANY, LIMITED. (237786) Regd. March 9, 1929. 104, Great Portland Street, W. 1. To carry on the bus. of mineral water mnfrs. and dlrs., etc. Nom. Cap.: £2,000.

WILSON BROS. (WEST HARTLEPOOL), LIMITED. (237841) Regd. March 11, 1929. Stranton Green, West Hartlepool. To take over the bus. of wholesale and retail grocers and provision mchts. cd. on at West Hartlepool as "Wilson Bros." Nom. Cap.: £5,000.

HALF PRICE GROCERS AND STORES, LIMITED. (237852) Regd. March 1, 1929. 758-760, Wimborne Road, Moordown, Bournemouth. To carry on bus. as indicated by the title. Nom. Cap.: £3,000.

PROPRIETARY PRODUCTS, LIMITED. (237916) Regd. March 14, 1929. 17, Annette Road, Holloway, N. To carry on the bus. of food specialists, etc. Nom. Cap.: £100 in £1 shares.

WM. PARTINGTON AND SON, LIMITED. (237921) Regd. March 14, 1929. To carry on the bus. of British and foreign yeast mchts., dlrs. in margarine, butter, and eggs, etc. Nom. Cap.: £2,000.

GLEBE SUGAR REFINING COMPANY (1929), LIMITED. (237957) Regd. March 15, 1929. To acquire certain premises, property, and assets in connection with the bus. of sugar refiners and mnfrs. cd. on at Greenock by the Glebe Sugar Refining Company, Limited. Nom. Cap.: £50,000.

WARTH'S CREAMY ICES COMPANY, LIMITED. (238021) Regd. March 18, 1929. To carry on bus. as indicated by the title. Nom. Cap.: £1,000.

CORNFORTH AND TAYLOR, LIMITED. (238031) Regd. March 19, 1929. To take over the bus. of mineral water and cordial mnfrs. and salesmen cd. on at Ashton-under-Lyne by L. Cornforth and J. Taylor, and also the land, bldgs., and stock-in-trade of the bus. of a mineral water mnfr. purchased by J. Taylor and W. Cornforth, now or formerly cd. on as "Garth and Schofield." Nom. Cap.: £5,000.

W. H. DAVIES, LIMITED. (238069) Regd. March 20, 1929. 151, Greengate, Salford, Manchester. To take over the bus. of grocers and provision mchts. cd. on at Salford, Manchester, and elsewhere as "W. H. Davies." Nom. Cap.: £200.

BARTON AND DIXON, LIMITED. (238109) Regd. March 22, 1929. 15, Church Road, Tunbridge Wells. To carry on the bus. of café and restaurant proprs., etc. Nom. Cap.: £1,000

H. AND G. WATTS (1929), LIMITED. (238116) Regd. March 22, 1929. 6, New Street, Sandwich, Kent. To take over the bus. of wine, spirit, beer and mineral water mchts. cd. on at Sandwich by H. and G. Watts, Limited Nom. Cap.: £10,000.

BRITISH AUTOMATIC REFRIGERATORS, LIMITED. (238129) Regd. March 22, 1929. 82, Victoria Street, S.W. 1. To enter into agmts. with the British Automatic Refrigerator Company, Limited, Thomas Hall and Son, Limited, the Tokenhouse Securities Corporation, Limited, and others, and to carry on the bus. indicated by the title. Nom. Cap.: £250,000.

JOHN THWAITES, LIMITED. (238197) Regd. March 25, 1929. 9, Bedford Chambers, Covent Garden Market, W.C. 2. To carry on the bus. of fruit and genl. produce mchts., etc. Nom. Cap.: £600.

WILSON AND KENNARD, LIMITED. (238221) Regd. March 26, 1929. To take over the bus. of a grocer, provision mcht., and genl. trader, cd. on at 14, Market Place, Warminster, as "Wilson and Kennard." Nom. Cap.: £5,000.

MATTHES, LIMITED. (238287) Regd. March 28, 1929. To carry on the bus. of confectioners, bakers, grocers, etc. Nom. Cap.: £8,000.

A. S. JUNIPER AND COMPANY, LIMITED. (238297) Regd. March 28, 1929. 369, Central Markets, E.C. 1. To take over the bus. of an importer and salesman of provisions, game and meat cd. on at West Smithfield, as "A. S. Juniper and Company." Nom. Cap.: £50,000.

London Gazette Information

Joint Stock Companies.

The names of the undermentioned companies have been struck off the Register and are dissolved:

English Concentrated Produce, Limited.
Grocers' Alliance Company (London), Limited.
Golder's Food Products, Limited.
Meatmaco Products, Limited.
Milk Wine Company, Limited.
Mozambique Sugar Development Company, Limited.
Premier Food Products, Limited.
Prickly Pear Products Proprietary, Limited.
Sena Sugar Factory, Limited.
South Irish Milk Company, Limited.
Surrey Farm Preserves, Limited.

. Voluntary Liquidations

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

SOMERSET DIRECT DAIRIES, LIMITED. Resolved, April 23, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. F. J. Sully, F.C.A., 84-85, High Street, Weston-super-Mare, be appointed liquidator.

PROVISION TRADERS, LIMITED. Resolved, April 24, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. J. H. Hodge, Accountant and Auditor, 32, Queen Street, Cardiff, be appointed liquidator.

ROBINSON'S BREWERY, LIMITED. Resolved, April 24, that the company be wound up voluntarily, and that Mr. N. D. Thompson, of Highfield Lawn, Derby, be appointed liquidator. N.B.—The liquidation is for the purpose of amalgamation. All debts due by Robinson's Brewery, Limited, will be paid in full.

BRISTOL CREAMERIES, LIMITED. Resolved, April 19, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. F. J. Sully, F.C.A., 84-85, High Street, Weston-super-Mare, be appointed liquidator.

CAMBS. FARMERS' CO-OPERATIVE CREAMERY, LIMITED (in voluntary liquidation). Creditors of this Society are required to send their claims by June 8 to Mr. G. H. Lewis, the liquidator, of 22, St. Andrew's Street, Cambridge.

Special Law

HOVIS, LIMITED, *v.* EXPRESS DAIRY, LIMITED

Before Mr. Justice Romer, in the Chancery Division, mention was made of the action of Hovis, Limited, against the Express Dairy Company, Limited, on a motion for judgment. It was stated that the defendants had paid an agreed sum for damages and costs, and had given an undertaking to refrain from selling as Hovis bread any bread that was not exclusively made from flour supplied by the plaintiffs.

Judgment was entered accordingly.

Earlier Proceedings.

In earlier proceedings, before Mr. Justice Maugham, Sir Duncan Kerly, K.C., plaintiffs' counsel on that occasion, said that he had a motion to restrain the defendant company, who owned a large number of tea-shops and restaurants, from selling bread, not made with Hovis flour, as Hovis bread. A large number of actions raising the same question had been fought, and a large number of injunctions had been obtained.

The defendant company had, on many occasions, according to the evidence in their possession, by accident or otherwise, sold as Hovis bread bread which was not made with plaintiffs' flour. They had written to defendants and complained on many occasions, and had got no attention, but recently, as the practice had continued, his clients felt obliged to appeal to the Court, and they were prepared to prove that on twenty or more occasions tests had been made, and there had been a chemical analysis of the bread which had been ordered as Hovis bread which showed that it was not Hovis bread.

(*Continued from next page.*)

344. Fatigue. (*Jour. Exper. Psych.*, 10, 5, 370-396.)

345. Turbidity in Sugar House Solutions. King. (*Planter and Sug. Man.*, 82, 14, 261-265.)

346. Albuminous Compounds from the Meat of Different Animals. Beck and Casper. (*Z. Unters. Lebensm.*, 1928, 56, 437-457.)

347. "Hypervitaminosis" and "Vitamin Balance." Harris and Moore. (*Biochem. J.*, 1928, 22, 1461-1477.)

348. Gas in the Catering and Food Trades. (*The Empire Mail*, 18, 3, 176-177.)

349. Inversion of Sucrose in Beet House Syrups. Brown and Dahlberg. (*Planter and Sug. Man.*, 82, 15, 281-283.)

350. Pan Boiling. Saint. (*Ibid.*, 283-285.)

351. Latest Development in Ice Manufacturing Equipment. Phillips. (*Ice and Refrig.*, 76, 4, 261-262.)

352. Quality versus Quantity Production. Lucking. (*Ice-Cream Ind.*, 4, 1, 19-21.)

353. Catalyst Poisons. Kempf. (*Man. Conf.*, 1929, April, 50-52.)

354. Centrifugals and their Operation. Aman. (*Planter and Sug. Man.*, 82, 16, 304-305.)

355. Chain Stores in Canada. Hints to British Food Exporters. (*Can. Exp. Pion.*, 10, 117, 195.)

Analysis

356. Comparison of the Monier-Williams and the A.O.A.C. Methods for the Determination of Sulphurous acid in Food Products. Fitelson. (*J. Assoc. Off. Agric. Chem.*, 120-129.)

357. Colorimetric Determination of Nitrates in Soils and Waters. de Nardo. (*Compt. rend.*, 188, 563-565.)

358. Determination of the Nutrient Value of Soils by Pot Experiments. Neissmann. (*Z. Pflanz. Düng.*, 8B, 76-79.)

359. Use of 2: 6-dichlorophenol-indophenol as Reduction Indicator in the Examination of Foodstuffs. Tillmanns, Hirsch, and Reinshagen. (*Z. Unters. Lebensm.*, 56, 272-292.)

360. Reactions in Soya Bean Oil. Richard. (*Ann. Falsif.*, 1929, 21, 240, 579-582.)

361. Component Glycerides of Cacao Butter. Lea. (*J. Soc. Chem. Ind.*, 1929, 48, 41-46T.)

362. Determination of Copper in Biological Materials. Elvehjem and Lindow. (*J. Biol. Chem.*, 1929, 81, 435-443.)

363. Determination of the Digestibility of Protein by Bergeim's Method. Gallup. (*J. Biol. Chem.*, 1929, 81, 321-324.)

364. The Differentiation of Pressed and Extracted Cocoa-butter. Aufrecht. (*Chem. Zeit.*, 1929, 318.)

365. Determination of the Starch Value of Frozen Potatoes. Lampe. (*Z. Spiritusind.*, 52, 92-93.)

Current Literature

Fruit and Vegetable Products

296. The Corrosion of Iron and Tin when immersed in Fruit and Vegetable Products. Culpepper and Moon. (*Canner*, 68, 18, 17-21.)

297. The Effect of Hard Water on Vegetable Preservation. Rabinowitsche. (*Braunschw. Kons. Z.*, 1929, 18, 5-6.)

298. Lemon Pectin. Poore. (*Jour. Frank. Inst.*, 199, 699.)

299. The Determination of Benzoic Acid in Jams. V. Kellenburg. (*Mitteil. Lebensm.-Unters. u. Hyg. d. Schweizer. Gesundheitsamtes*, 1925, 16, 6-15.)

300. Pectose-Pectin Relationship in Apple-tissue. Carré. (*Biochem. Jour.*, 19, 257-265.)

301. Pickling of Frozen Potatoes. Glaubitz. (*Z. Spirilusind.*, 52, 84.)

302. Cacao Beans and Cocoa Products. Fincke. (*Z. Unters. Lebensm.*, 56, 312-334.)

303. Little-known Facts about Tomato Colour. McGillivray. (*Canner*, 68, 15, 17-18.)

304. The Determination of Small Quantities of Starch in Vegetable Tissue. Bish. (*Biochem. Jour.*, 23, 1, 31-34.)

305. Syrup Arithmetic. Fellers and Mack. (*Canning Age*, 1929, April, 370-372.)

306. Determination of Traces of Iodine in Vegetables. McClendon and Remington. (*J. Amer. Chem. Soc.*, 1929, 51, 394-399.)

307. Isolation of Mesaconic Acid from Cabbage Leaves. Buston. (*Biochem. J.*, 1928, 22, 1523-1525.)

308. Temperature Influences on Yield of Peas and Canning Quality. Boswell. (*Canner*, 68, 17, 19-20.)

309. Use of Paper Mulch in Vegetable Growing. Thompson. (*Ibid.*, 21-22.)

310. Observations on the Softening of Dill Pickles. Joslyn. (*Fruit Prod. Jour.*, April, 19-21.)

311. Pointers on Cold Packing. (*Glass Packer*, 2, 4, 154-156.)

312. The Manufacture of Maple Syrup. Meyer. (*Ibid.*, 160-162.)

313. New Grape Beverages. Farley. (*Ibid.*, 163-164.)

Cereal Products

314. Air Screening Method for Determining the Grain Composition of Powders. Gonell. (*Zeit. Ver. Deut. Ing.*, 72, 945-950.)

315. Improvement of Flour. Vuk and Spanyár. (*Z. Unters. Lebensm.*, 56, 292-308.)

316. Semi-micro Chemical Method for the Determination of Flour of Gluten in Flour. Röttinger. (*Mikrochem.*, 7, 106-109.)

317. Correlation Studies with Diverse Strains of Spring and Winter Wheats. Hayes, Immer, and Bailey. (*Cereal Chem.*, 6, 2, 85-96.)

318. The Relation of Hydrogen-Ion Concentration to Baking Quality of Flour. Fisher and Halton. (*Ibid.*, 97-114.)

319. The Phosphorus of Grains. Greaves and Hirst. (*Ibid.*, 115-120.)

320. Manganese in Cereals. Davidson. (*Ibid.*, 128-133.)

321. Hygroscopy in Flour Ash. Liddel. (*Ibid.*, 134-139.)

322. The Effect of Dry Skim Milk on the Water Absorption of Doughs and the Plasticity of Flour Suspensions. St. John and Bailey. (*Ibid.*, 140-151.)

Dairy Products

323. Types of Bacteria which Produce a "Caramel" Flavour in Milk. Kelly. (*Trans. Roy. Soc. Canada*, 22, 5, 243-248.)

324. Casein-splitting Properties of Starters (in Ripening of Cheese). Barthel and Sadler. (*Ibid.*, 233-235.)

325. Streptococcus Lactis Strain that Produces "Caramel" Odour and Flavour in Dairy Products. Sadler. (*Ibid.*, 243-248.)

326. Proportion of the Citrates of Milk Incorporated in the Curd During Cheese-making. Golding. (*Ibid.*, 237-242.)

327. Action of Rennin. Grimmer and Hinkelmann. (*Milch Forsch.*, 6, 272-301.)

328. Seasonal and Monthly Variations in the Average Composition of Milk. Andrew. (*New Zealand Jour. of Sci. and Technol.*, 1928, December, 229-235.)

329. Applications of the Nitrile Method.—II. Lippich. (*Zeitschr. Anal. Chem.*, 76, 9-10, 321-335.)

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334. Three Methods of Pasteurising Milk for Cheddar Cheese Making. Price and Prickett. (*Jour. Dairy Sci.*, 11, 1, 10-15.)

335. Detection of Egg-Yolk in Margarine. Angerhauser and Schulze. (*Pharm. Zentr.*, 70, 133-137.)

Various

336. Density of Lard. Halden and Kunze. (*Chem. Umschau.*, 36, 61-62.)

337. Measurement of Suction Forces in Soil. Shaw. (*Soil Sci.*, 27, 111-115.)

338. Effects of Different Nitrogenous Fertilisers. Gerlach. (*Z. Pflanz. Düng.*, 8B, 89-91.)

339. Importance of Hydrogen-ion Concentration for the Distillery. Diemair and Sichert. (*Bioch. Zeit.*, 204, 414-430.)

340. Crystalline Dextrose as Means for Making New Candies. Wesley. (*Conf. Jour.*, 651, 65-67.)

341. The Vitamin Content of Honey. Hoyle. (*Biochem. Jour.*, 23, 1, 54-60.)

342. Schemes for Promoting Co-operation of the Worker in Industry. Mayor. (*Ind. Psych.*, 4, 6, 340-347.)

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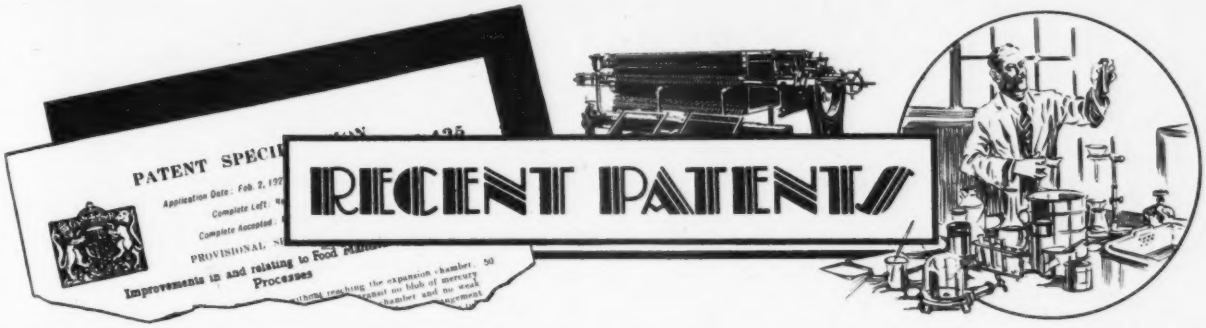
(Continued on preceding page.)



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304,115. **Tea infusers.** ABBOTT, W. T., 106, Larchwood Drive, Cambridge, Massachusetts, U.S.A.

304,230. **Baking powders.** WEIL, L., 16, Neue Strasse, Strassburg, France. (Not yet accepted.)

In baking powders wherein the acid constituent is formed by acid alkali phosphates or acid alkali pyrophosphates, in order that, in use, there may be an acid end reaction, corresponding to the acid obtained with yeast, inorganic or organic neutral salts or other combinations of earth alkali metals, such as of calcium or of magnesium, but other than calcium carbonate and calcium phosphates, are added to the powder. For example, calcium chloride, calcium tartrate, calcium carbonate, and pyrotartaric acid, or calcium in combination with casein may be used.

304,253. **Preserving food.** STABBACK, A. G. M., 38, Bonneville Gardens, Clapham Park, and STABAVITE SYNDICATE, LIMITED, 41, Charing Cross Road, both in London.

In preserving fruit, eggs, poultry, meat, and other foodstuffs, a mixture of gum tragacanth or other gum which swells in contact with water without becoming sticky with glycerine, with or without a bisulphite or an alkali nitrate or other preservative, is used. The foodstuff may be coated by dipping in or painting with a solution of the mixture in a solvent such as water, or may be wrapped or packed in paper, sacking, cartons, etc., which are impregnated with the mixture. Cream, butter, margarine, lard, or other fats, sausages, or pies may be packed in the treated cartons. The preservative mixture may be made acid by adding a small amount of sulphuric acid, or alkaline—*e.g.*, by adding sodium bicarbonate. Where the foodstuffs treated are liable to mould—*e.g.*, apples—a small quantity of oil of cloves or other suitable essential oil is also added.

304,267. **Bottling.** HOWARD, H. W., AND HAYWARD, TYLER, AND COMPANY, LIMITED, 99, Queen Victoria Street, London.

304,271. **Packing butter, etc.** NAAMLOOZE VENNOOTSCHAP H. HARTOG'S FABRIEKEN, Oss, Holland.

Butter or margarine, brought into cylindrical disc shape to fit into a normal butter dish, is packed in a single wrapper, a portion of which may be used as a handle for removing the disc from an outer cover or casing.

304,314. **Yeast.** SELBI SOC. D'EXPLOITATION DE LICENCES DE BREVETS INDUSTRIELS, 29, Croix d'Or, Geneva, Switzerland.

Vinasses from molasses distilleries, sugar or yeast factories are used either alone or with molasses or other vegetable hydrocarbon material for the production of yeast to be used as a food for animals.

304,361. **Cow-milkers; cooling milk.** HOSIER, A. J., Wexcombe House, Burbage, Marlborough.

304,370. **Milking machines.** DINESEN, L., 2125, Hennepin Avenue, Minneapolis, U.S.A.

304,389. **Preserving food, etc.** SUTAX, LIMITED, AND SUTCLIFFE, J. W., 10, Charterhouse Street, London.

304,473. **Pasteurising milk, etc.** HOLTE, H., Skien, Norway.

304,530. **Slicing fruit.** WILMKING, F. (trading as WILMKING, G.), Gutersloh, Westphalia, Germany.

304,553. **Packing biscuits.** FERGUSON, A. J., Vista, Gareloch, near Helensburgh, Dumbartonshire.

304,868. **Preserving fish.** LANGVA, H. K. T., 13, Kirkegatan, Aalesund, Norway.

Fish which has been split, salted, and dried, is protected from damage by the split-fish mite by placing it, after drying, in a chamber from which the air, oxygen, and humidity are then removed—*e.g.*, by an air pump. The fish is left in the evacuated chamber for a suitable time—*e.g.*, three days—after which it is stored or transported in the usual way. Nitrogen, carbon dioxide, or other harmless gas may be introduced into the chamber after the evacuation. The chamber may repeatedly be evacuated and recharged with the gas which is finally left in the chamber.

304,902. **Preserving egg yolks.** BELHOMMET (née LYS), H., 361, Rue Léopold 1er, Jette, Brussels.

Egg yolks to be preserved by drying have first added thereto a quantity—*e.g.*, 4 per cent.—of sugar or other suitable water-soluble substance which will enable the dried yolks to be reconstituted by adding the requisite amount of water. The yolks may be dried until 50 per cent. of the water is removed.

304,965. **Meat presses.** SEYMOUR AND SON, LIMITED, A. H., 23a, Deering Street, SEYMOUR, A. H., AND SEYMOUR, K. A., 14, Bridgford Road, West Bridgford, both in Nottingham.

305,076. **Drying hops.** WEBER, L., 103, Vicarage Road, Langley, Birmingham.

305,371. **Closures for bottles, etc.** KEYSER, C., 312, King Street, Hammersmith, London.

305,544. **Protecting metals from corrosion, etc.** METALLGES AKT.-GES. (formerly METALLBANK UND METALLURGISCHE GES. AKT.-GES.), Frankfort-on-Main, Germany.

Coating; cased or compound forms.—A coating of pure aluminium or of an aluminium alloy such as an aluminium-silicon alloy is applied to metals or alloys such as magnesium or magnesium alloys. The aluminium, etc., may be cast round a block of magnesium, etc., or the magnesium, etc., may be cast into a shell of aluminium, etc., or tubes, sheets, or bands of aluminium, etc., may be applied to the magnesium, etc., article, the compound article being worked up as required; or the coating may be applied by dipping.

305,697. **Closures for bottles.** TRUST, LIMITED, D. AND G., Bassishaw House, Basinghall Street, London. (Drake Process Inc.; 923, Guarantee Title Building, Cleveland, Ohio, U.S.A.)

305,739. **Packing eggs.** JONES, E. R., Jesmondene, Broadlands Avenue, Shepperton, Middlesex.

Eggs are packed whole in the shell in small containers from which the air is extracted; wood wool, rice husks, paper, cardboard, liquids, or other materials being included to prevent damage. The containers may have unseamed or unsoldered lids held in place by the pressure due to the vacuum, rubber, etc., packing rings being disposed between the lid and the body. The air within the shell is stated to be extracted through the pores of the shell. According to the Provisional Specification, plastic material may be used, and the containers may be lined with celluloid.

305,844. **Preserving liquid eggs.** EPSTEIN, A. K., 6832, South Ridgeland Avenue, Chicago, U.S.A.

305,972. **Curing meat.** HERIOT, M. M., Great Testwood, Totton, Southampton.

In curing and preserving meat, such as bacon and ham, the meat is placed in a curing vessel which is then sealed and evacuated and a preservative liquid admitted so as to cover the meat, the evacuation being maintained during the whole curing process and adherence of the meat to the walls of the vessel being prevented by the use of trays, grids, wire nets or meshes, etc., for supporting the meat. The trays, etc., may be disposed about nine inches apart and may be supported by bolting on to angle-iron crossbars which are fixed to the side walls of the curing vessel. The trays may be of perforated steel.

306,011. **Ice-cream freezers.** MARCHINI, B., 45, Manchester Street, Huddersfield. (Passatti, G.; 6, Chemin Vicinate de St. Marthe, Marseilles, France.)

306,013. **Preserving liquid egg materials.** DONNER, A., 67, Margaret Street, London.

306,020. **Extracting fish oils.** MANUFACTURE DE MACHINES AUXILIAIRES POUR L'ELECTRICITE ET L'INDUSTRIE, 20, Boulevard du Parc, Neuilly-sur-Seine, France.

306,124. **Centrifugal machines.** ATELIERS T. ROBATEL, J. BUFFAUD ET CIE, 39, Chemin de Baraban, Lyons, France.

306,466. **Closures for bottles and other containers.** CARPMAEL, R. H., Moulton, Northampton.

306,504. **Mixing machines.** WEITZ SOC. ANON., LES FILS DE J., 111, Chemin des Cullattes, Lyons, France.

306,536. **Steam and like cooking apparatus.** VIARDOT, L., 11, Rue Niepce, Paris.

306,545. **Centrifugal extractors.** KRANTZ, H. (Firm of), Industriestrasse, Aachen, Germany.

306,644. **Making wafer biscuits.** ANTONELLI, D., Progress Works, Ayres Road, Old Trafford, Manchester.

306,706. **Delivering liquids in measured quantities.** TUPPER, A. C., 11, The Promenade, Seven Kings, Essex.

306,743. **Ice-cream cabinets and tubs.** WHITE, C., 86, Hainton Avenue, and COOK, J. C., 21, Algernon Street, both in Grimsby.

306,769. **Tea manufacture.** SUTTON, L. H., Bowling Iron Works, Bradford.

306,833. **Refrigerating.** HOOVER, LIMITED, 229, Regent Street, London. (Assignees of Smellie, D. G.; Canton, Ohio, U.S.A.)

306,948. **Centrifugal machines.** AKTIEBOLAGET SEPARATOR, 8, Fleminggatan, Stockholm.

306,978. **Bottling machines.** NIELSEN, H. V., West Wharf, Cardiff.

307,043. **Seals for paper, etc., bags.** HARTMANN, C. W., Lyngby, near Copenhagen.

307,049. **Bottles.** COURVOISIER, LIMITED, 15, Northumberland Avenue, London.

307,065. **Centrifugal machines.** BERGEDORFER EISENWERK AKT.-GES., Sande, near Bergedorf, Hamburg, Germany.

Density separators; discharging.—A centrifuge for the separation of solids from liquids has mechanical scraping means to transport separated solids to discharge openings in the bowl wall.

307,075. **Centrifugal machines.** PERSOONS, J., Thildonck, and PERSOONS, A., Wespelaer, both in Belgium.

307,115. **Ice-cream servers, etc.** COOPER, A. J., 23, Bartlett's Buildings, Holborn Circus, London.

Printed copies of the full Published Specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.